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CONTENTS

Survival and Reproduction in a Song Sparrow Population During One Season	By Margaret Morse Nice	91-102
Notes on the Song and Territorial Habits of Bullock's Oriole	By Alden H. Miller	102-108
The Status of the Goshawk in Pennsylvania	By George Miksch Sutton	108-113
Birds of Southern Louisiana	By Alfred M. Bailey and Earl G. Wright	114-142
Editorial		143-144
General Notes		145-154
Ornithological Literature		155-162

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THE WILSON ORNITHOLOGICAL CLUB

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SURVIVAL AND REPRODUCTION IN A SONG SPARROW POPULATION DURING ONE SEASON*

BY MARGARET MORSE NICE

The Song Sparrow (*Melospiza melodia melodia*) is the dominant avian species in the pioneer weed association on the east bank of the Olentangy River between the Doddrige Street and Lane Avenue bridges in Columbus, Ohio; sixty-four pairs lived on approximately fifty acres in April, 1930. Near the river and on the bluff to the east are cottonwoods, sycamores, buckeyes, elms, silver maples, and hackberries. Shrubs are almost wanting except for large patches of elder. The chief weeds are sweet clover, cow parsnip, teasel, dandelion, burdock, golden rod, Canada thistle, and giant ragweed.

In 1930 I made a study of the Song Sparrow population most conveniently situated from our house, obtaining data on the success of the first brood in the case of forty pairs, of the first and second broods with thirty pairs, and a complete record of sixteen pairs. As the season progresses, the difficulties of keeping track of a large number of birds increases, due to the rankness of the vegetation and the subdued activity of the birds themselves. Twenty-seven of the males and twenty of the females were marked with aluminum and celluloid bands,[1] in most cases the birds having been trapped on their respective territories. Some males that were not banded were distinguishable by their songs, while other birds were known by position, for each pair for the most part stays closely throughout the season within the two-thirds of an acre or so which it calls home.

The accompanying map shows the territories of forty pairs on approximately thirty acres as affairs stood the last of May. Each pair is designated by a field number which has no connection with the band number; the field number followed by *m* refers to the male. Each female is named by the number of her first mate followed by *f*

*Read before the Seventeenth Annual Meeting of the Wilson Ornithological Club at Cleveland, Ohio, December 29, 1930.

[1]See Burkitt, J. P., *British Birds*, 1924, Vol. 17, p. 295; and Butts, W. K., *Bird-Banding*, 1930, Vol. 1, No. 4, pp. 158-163.

and the year—as 4*f*29; if there were more than one mate in a season a letter is added as 18*f*30*a*, 18*f*30*b*. The details of this scheme of nomenclature as well as my technique in finding nests has been discussed elsewhere.[2] The boundaries of the territories were not rigidly fixed, each pair trespassing on the land of its neighbors' and many disputes being staged, but in general they stay about the same throughout the season.

Survival

In the fall and winter the Song Sparrow is admirably protected by his coloration and his habit of diving into cover upon suspicion of danger, in this locality being noticeably more cautious than the Junco or Tree Sparrow. But from February or March through June, the male, busied with affairs of his territory, comes boldly into the open to sing or quarrel, while both parents expose themselves recklessly when concerned over the safety of half grown young. An unexpectedly large mortality of nesting adults was found.

On April 15 there were thirty pairs on the twenty acres nearest us—all the birds on the map north of and including 12, 30, 2, and 7, but not 44.[3] But by early July there were only twenty-five pairs and (one-sixth)—one-fourth of the whole number. Five new females and two new males had come in. Three pairs were lost outright—7, 16, and 46. There were two re-matings of neighboring widows and widowers—26*m* and 27*f*, 30 *m* and 13*f*. 20*m* lost his mate in late May and never procured another, although he stayed on his territory to the end of June and was again singing there from September 28 to October 14. 29*m* came May 21, carved out a new territory and was soon joined by a female. 47*m* appeared in mid-June, but remained a bachelor. 4 *m*, on the other hand, had three different mates in 1930. Where both birds survive, Song Sparrows normally keep the same mates throughout the season; primarily, I believe, because so preeminently rooted to the soil, secondarily, because of their habit of often starting another brood as soon as the first is out of the nest.

Reproduction

Nest Statistics. Sixty-one nests were located while occupied and three others later in the season. A second nest was never placed in close proximity to the first, the distance between succeeding nests two lone males. Ten females had been lost (one-third), and five males ranging from 32 to 190 feet, the average of twenty-four cases being

[2] *Bird-Banding*, 1930, Vol. 1, No. 4, pp. 177-181.

[3] 46 was present, but 29 was not; the former's territory lay between 26 and 27 and was appropriated by 26 after the disappearance of 46 and his mate.

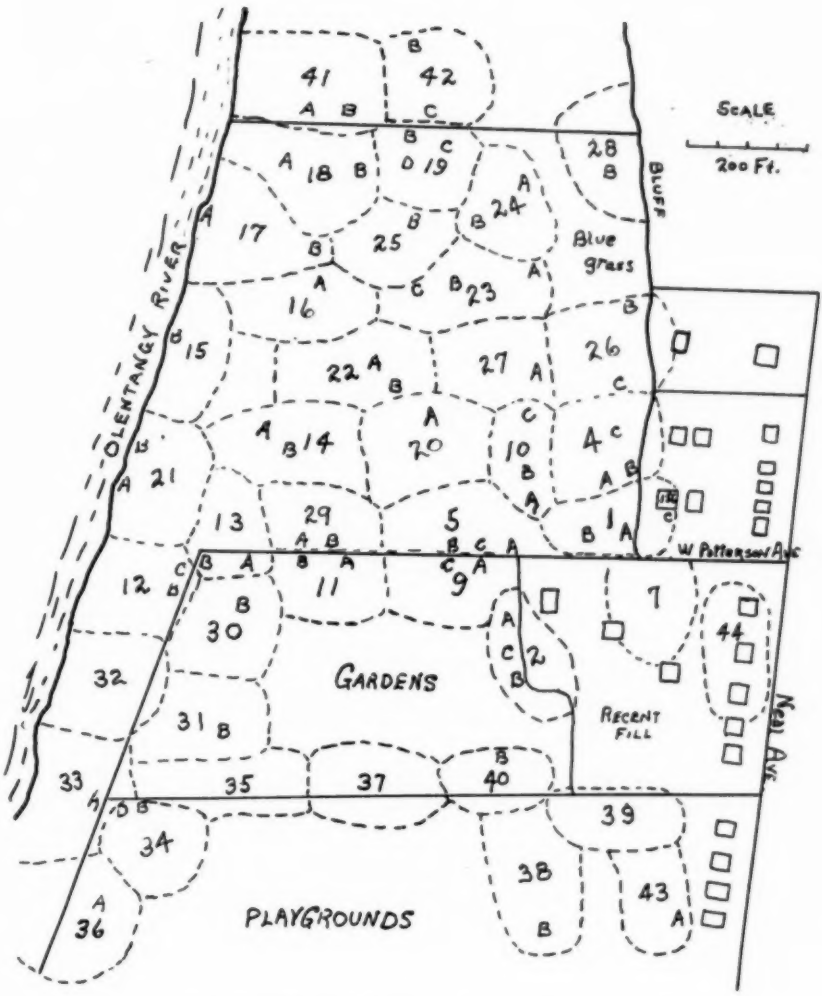

FIG. 13. Map of the Song Sparrow territories.
The letters A, B, C, represent the first, second, and third nestings.

84 feet. The sixty-four nests are classified in Table I as to height from the ground and excellence of concealment, while data on the number of eggs is given in the case of thirty-seven nests. All nests of the first attempt were placed on the ground, half of the second attempt and a third of the third attempt being in the same position; the average height of all the nests of each attempt increased with the advance of the season.

TABLE I

Song Sparrow Nests in 1930.

	HEIGHT			CONCEALMENT				SIZE OF SETS			
	Per cent on ground	Height of others in inches	Average height of all	Numbers of Nests Excelnt.	Good	Fair	Poor	No. of Nests Containing 5eggs	4eggs	3eggs	Avg.
First Attempt	100	-	0	17	3		2	7	7	0	4.5
Second Attempt	50	3-15	3	17	1	8	1	7	7	2	4.3
Third Attempt	33	5-30	7.5	7	3	1	1	0	3	3	3.5
Fourth Attempt	0	6-10	8.5			2	1	0	1	0	4.0
Total				41	7	11	5	14	18	5	4.2

Although these birds began to nest in mid-April when the vegetation had hardly started, the earliest nests appeared to be better hidden than the later ones, concealment according to my point of view being excellent in 77 per cent of the first attempt, 63 per cent of the second, and 58 per cent of the third. The favorite situation was under prone weed stalks. Taking the nests throughout the season, fourteen were found in this position; the other most usual sites were, under Canada thistle, seven cases; in miscellaneous weeds, seven; in weeds and stalks, six; in weeds and grass, five; in blue grass, five.

There was some correlation between excellence of concealment and success of the nest, since 56 per cent of this class raised young, while this was true of but 35, 36, and 40 per cent of those rated good, fair, and poor respectively. However, there was not necessarily any consistency in the same bird, for the first nest was sometimes well hidden and the second conspicuous, or the reverse might be true. Of the twenty females of which two to three nests were found, none built nests that were consistently poor or mediocre in concealment. One built two which I considered fair and good respectively; another built three nests which were rated good. Eighteen scored excellent in from one to three cases, but eight of them had one nest apiece which rated fair, and three of them had nests which rated poor.

As to the numbers of eggs, only those nests are included in the table where the set was known to be complete and that contained no Cowbird eggs. In eighteen cases four eggs were laid, in fourteen

cases five, and in five cases three. The first two attempts average much the same in size, but in the third there was a decrease.

Success and Failure of Nests. Of the first attempts of forty pairs of Song Sparrows, the young of fifteen nests left in safety, while all the others came to premature ends, giving 37.5 per cent of success. The fate of seventy-nine nests of the thirty pairs is shown in Table II.

Table II

Success and Failure of the 79 Nests of the 30 Pairs.

	Numbers		Per Cent	
	Success	Failure	Success	Failure
1st Attempt	10	20	33.3	66.6
2nd Attempt	12	15	44.4	55 6
3rd Attempt	7	10	41.2	58.8
4th Attempt	3	2	60.0	30.0
Total	32	47	40.5	59.5

The data are complete for the first two broods, but not for the last two; there were three attempts whose outcomes were unknown and a possibility of five other attempts, none of which could have succeeded. Here, as with the data on the forty pairs, there is some evidence of a greater mortality among early nests than later ones, the percentage of success in the first attempt being only 33.3, but for the whole season 40.5.

Table III gives the complete record of sixteen pairs that survived the season.

Table III

Complete Record of 16 Pairs that Survived the Season.

Numbers of Pairs	Number of Successes	Number of Failures
1	0	4
2	1	3
6	1	2
1	2	2
5	2	1
1	3	0
16	22	29

The most common experience—shared by six pairs—was one success and two failures, two successes and one failure being the lot of five pairs. One pair had four failures and no success; one had no failure and three successes. (In 1929 one of the two pairs I studied experienced two failures followed by two successes, the other one failure and then three successes; the first raising five young, the second nine). Four pairs made four attempts and twelve pairs three attempts. The percentage of success was 42.3. Each pair averaged 1.4 successful attempts; 1.8 unsuccesful attempts.

The actual numbers of young raised (i. e. that left the nest in safety) by fifteen pairs[4] that survived the season were as follows: 0, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 6, 7, 7, 10—a total of 64, an average of 4.3 a pair. The last four figures represent two broods each, hence eighteen broods were raised, averaging 3.6 young to a brood. Mr. E. M. Nicholson[5] reports that on forty acres in England 169 adults of eight species raised 299 young, giving an average of 3.6 young per pair.

Of the 61 nests that were located, 17 came to their ends while containing eggs, and 15 while containing young. At least 240 eggs were laid in the 61 nests (although the number should have been about 255); 151 young were hatched in 44 nests; 102 young were fledged in 29 nests. Thus in 72.1 per cent of the nests young were hatched, in 47.5 per cent they left in safety. Of the eggs, 63.0 per cent hatched, and 42.5 per cent were fledged. (It is interesting to compare these figures with those given by Nicholson for a 20 acre tract: 687 were eggs laid in 156 nests; 420 hatched—61.1 per cent; 300 fledged—43.7 per cent). The average number of eggs in the nests was 3.9, the average number of young raised in the 29 successful nests 3.5.

In order to trace this shrinkage between the number of eggs laid and the number of young raised per successful nest, let us examine the matter of full and partial successes. In 24 successful nests in which I am sure of the quota of eggs, 99 eggs were laid and 88 young raised—an average of 4.1 eggs and 3.7 young per nest. In 15 of these nests 63 eggs were laid and 63 young fledged—an average of 4.2 eggs and young each; but in 9 nests 36 eggs were laid and 25 young fledged—an average of 4 eggs and 2.8 young each. The loss in these 9 nests was 30.6 per cent, in the whole 24 it was 11.1 per cent.

This loss is largely due, not to outside factors (except for one young bird crushed by a Cowbird nest mate), but to imperfect functioning of parental behavior. Four eggs failed to hatch, one because infertile, the other three being addled. In two cases this latter condition was the fault of the nest; in the first an egg had slipped into a depression, in the other the nest had been pressed out of shape by the growth of the thistle in which it was placed.

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[4]Nine of these two sets—the 16 pairs and the 15 pairs—were the same, the others different, for in some cases the total number of young was not known, as a nest had not been found, although parents were observed feeding young out of the nest; and in the other cases I have full data as to the successes, but am not sure how many failures occurred.

[5]Encycl. Brit., 14th Ed., 1930, Vol. 3, p. 634.

Two young in one nest apparently perished while hatching. One six-day nestling was found dead outside the nest, presumably pulled out by a parent. Two in a nest died of starvation, apparently as a result of poor care by the parents; (the male was a young bird and the female probably was also; this was their only success this season). The last nestling was deserted by its parents and allowed to perish after the other young had left. I had banded this brood in the morning at the age of nine and ten days amid great parental excitement; three dispersed and were cared for by the adults some twenty yards to the east during the next two days, but one remained in the nest. By afternoon it was calling loudly and the next morning was dead. It may have been that the parents were so conditioned by their fright at the nest, that they would not return to it despite the pitiful cries of the offspring.[6].

The Young After Leaving the Nest. Mortality during the fourteen to eighteen days of parental care after the young have left the nest is a hard matter to keep track of, since the fledglings are adepts at hiding in the weeds. In only a few cases did I use colored bands on the nestlings, so that even when I saw grown young being fed, it was not often possible to discover whether or not all of the brood had survived. I know that three broods were wiped out a few days after leaving the nest, but some at least of nineteen broods were reared to independence. In three cases I know they all survived, and in two cases at least six out of nine birds. On eight broods I have no data.

Causes of Mortality

Under possible causes of mortality let us consider the weather; parental efficiency; man; introduced enemies; and natural enemies.

The Weather. Three ways in which weather might influence the nesting Song Sparrows are: the destruction of eggs and young

[6]For instances of young perishing through misadventure in hatching see Nelson (*Bird-Banding*, 1930, Vol. 1, pp. 1-12); and Harding (*Bull. North-eastern Bird-Banding Assn.*, 1929, Vol. 5, pp. 77-80). Stephens describes how a Red-eyed Vireo, trying to jerk a worm out of the mouth of one of its young, pulled the latter out of the nest (*Bull. Lab. Nat. Hist., Univ. Iowa*, 1919, Vol. 7, No. 3, pp. 25-38). As to fright at the nest preventing a parent returning to care for young, see Bigglestone (*Wilson Bulletin*, 1913, Vol. 25, pp. 49-67) for this behavior in a male Yellow Warbler after a snake had taken one of his young. Two somewhat similar instances have come to my notice: a black snake was killed by us after it had eaten two of a brood of Robins, but neither parent came back to the remaining young. Song Sparrow 27*m* was so disturbed by my placing a drop trap over his nest containing seven-day young that he deserted and never returned, leaving his mate to struggle alone with the rearing of two Cowbirds.

through storms; possible lessening or change in food supply; effect on length of the breeding season.

The exceptionally dry season of 1930 was favorable to nesting, so that not a single nest nor young bird under observation came to its end through cold rains. It seems probable that a larger proportion than usual of fledglings survived after leaving the nest.

As to the food supply, two entomologists tell me that while the numbers of some insects were decreased in this region by the drought, others were increased; they believe that the insect supply was as ample as usual. Seeds of early maturing weeds were always available. The July broods of the Song Sparrows were brought off in full numbers at the normal age of nine and ten days.

The nesting season of 1930 began about ten days later than that of the previous year. In 1929 I found the first egg April 10 (laid by 1/29); in 1930 no egg was found before April 20 on which date three birds (one of them 1/29) began to lay, although in two other nests the first eggs must have been deposited April 18 or 19.

Molting began earlier in 1930 than in 1929. In the former year adults were in the midst of the molt the first half of September, eight such birds—two without tails—being noted in a willow stub by the Olentangy September 8. 4*m* was in full molt September 8 and 15, but had nearly completed it September 19; he did not begin to sing freely until September 24.

In 1930 several nesting birds had started molting by July 12. On September 7 two of the banded females were entirely through the process and two days later another female and 4*m* were practically through. The only unbanded molting adults noted after our return to Columbus, September 7, were single birds seen September 12 and 14. 4*m* began to sing in earnest September 10. As to 1*m*, he had hardly sung at all during the fall of 1929, but in 1930 he sang quite regularly in the early morning—sometimes as many as sixty-three to eighty-four songs an hour—from September 17 to October 11. In 1929 he was last seen October 14, in 1930 October 15, the other summer resident males[7] leaving at about the same time, so migration does not seem to have been hastened by the earlier molt.

According to the United States Weather Bureau the five months of 1929 influencing the nesting season were characterized as follows (the deviation from the mean of the last 47 years at Columbus being given first): March, +8.3°, persistent and summer-like warmth from

[7]Of my 27 banded males, 12 are (or were) residents throughout the year, 13 are summer residents.

the 12th on; April, +3.2°, great temperature changes; May, –2.6°, persistently cool, abundant precipitation; June, –2.2°, much cool weather with frequent storms; July, –0.7°, changeable temperature, precipitation above average.

In 1930 the weather was markedly different: March, –0.5°, changeable, precipitation below normal; April, +3°, changeable, dry; May, +2.1°, warm, abnormally dry; June, +1.1°, one of two dryest Junes in 47 years; July, +2.1°, hot, especially in last half, dryest July in 77 years.

In 1929 the abnormally warm weather during the last two-thirds of March appears to have hastened the beginning of the breeding season. During the excessively dry and comparatively hot summer of 1930 the molt started about two weeks earlier than the preceding year. (Whether this was due to a change in diet, to a more direct debilitating effect of the continued heat and drought, or to some other factor, I will not venture an opinion). Thus the season of 1930 was shorter at both ends than that of 1929, and the numbers of attempts at nesting must have been reduced in consequence. The majority of the thirty pairs were through nesting by mid-July, and three or more as early as the end of June; none had young in the nest later than July 27. In a more normal season more pairs might have made fourth attempts.

Efficiency of Parents. So far as nest building goes, the female Song Sparrow constructs a stable, adequate structure that in the majority of cases is well concealed. Only two of the nests found were placed on insecure foundations. While feeding young, the parents are adept at keeping the whereabouts of the nest a secret. The loss of ten eggs and young in the twenty-nine successful nests may fairly be laid to the charge of parental mistakes—i. e., 8.8 per cent of the 113 eggs laid. This is substantially less than that found by us with Mourning Doves in central Oklahoma; from 261 eggs in 130 successful nests 213 young were raised, a loss of 18.4 per cent, due largely to frailty of the nest.

Man. The influence of man has many ramifications—the clearing of the land, primarily beneficial to the species, now detrimental; the activities of his young; the introduction of new enemies; and finally, for this study, myself.

There are evidently many more Song Sparrows nesting on this flood plain at present than there could have been when it was covered with primeval forest. The northern half of the area, unprotected by dikes, is flooded nearly every year and consequently is almost use-

less for purposes of cultivation. To the south, however, people plowed up territories with entire disregard for Melospizan property rights, causing several pairs to retire to the edges of their land, and dispossessing one pair entirely with the result that the neighboring population was thrown into an uproar through the home seeking endeavors of the refugees. Some of the unmated birds that replace losses may have lost mates or territories due to human activities. In late June there were two visiting males on my twenty acres, each remaining about a week; on June 28 I banded an adult on 30's territory that I never saw again, and the same thing happened July 14 on 29's territory. The Song Sparrow is a remarkably adaptable bird and will cherish as his home places on the bluff in the southern end of this area that are nothing but masses of tin cans and weeds.

Boys are responsible for the loss of some of the adults, shooting the singing males and both parents when disturbed over young. They carried off two nests with eggs.

As for myself, I tried not to interfere with the course of events, not removing Cowbird eggs nor killing natural enemies. I did warn a man with a mowing machine away from a nest, I did bolster two insecure nests and replace three infants scattered a few inches from the rim; perhaps these good deeds counterbalanced the enemies I might have led to the nests. One set might have been deserted because of my visits, although on the whole the birds were remarkably tolerant of my interest in their doings. The nests found by me suffered fewer disasters than those that remained undiscovered; for of the fifty-seven nests of the thirty pairs that I found twenty-six, or 46 per cent, succeeded; but of the twenty-two I did not find, only six, or 27 per cent, succeeded.

Introduced Enemies. A number of self-hunting dogs infest the area and may break up nests. Cats undoubtedly destroy both the adults and young. Rats are probably a serious factor. The contents of five nests disappeared gradually, Song Sparrow eggs being preferred to those of the Cowbird, for none of the five latter were eaten until after they hatched. Here it is probable that rats were the guilty parties. A Ring-necked Pheasant was surprised just after she had emptied a nest of two-day old infants; I suspect it was she that threw the three four-day-old nestlings out of their nest.

Natural Enemies. Crows, Blue Jays, and grackles I have never seen hunting in the low situations favored by Song Sparrows, and the same is true of the few gray squirrels present. Two pairs of Sparrow Hawks nest by the Olentangy, one fifty feet north of 41's territory

and the other opposite 32's territory, but they do not hunt on this area during the nesting season. Opossums, weasels, and snakes are rather common and doubtless take their toll.

The Cowbird summers here in goodly numbers,depending on the Song Sparrow as its chief host early in the season, but later favoring the Maryland Yellow-throat also with its attentions. Twenty eggs of *Molothrus ater ater* were found in fifteen of the 61 nests; in five cases there were two eggs. Twenty-eight per cent of the first and second attempts were parasitized. 18 per cent of the third attempt; 24.6 per cent of all. Fourteen of the thirty pairs were victimized, one pair twice.

Seven Cowbird young were raised in six nests—35 per cent of success. In one nest two Cowbirds and no Song Sparrows were raised, in the others a single Cowbird with two Song Sparrows in one nest, with three Song Sparrows in each of three nests, and with five Song Sparrows in still another nest. Three Cowbird young brought death to three young Song Sparrows, in one instance crushing one of four nest mates, in the other the two Cowbirds crowding out two Song Sparrows. The quota of Song Sparrow eggs was full in three cases, was six eggs short in four cases, while as to the five other nests I do not know. Two nests were found with two Song Sparrows and one and two Cowbird nestlings respectively; here there should have been three or four more of the former species. In the twenty-nine successful nests, three to seven more Song Sparrows should have been raised without Molothrine interference, and four Song Sparrows in the nest that produced only two Cowbirds; hence without this parasite seven to eleven more Melospizan young would presumably have left the nest in safety. This season about a 9 per cent loss from otherwise successful nests is attributable to the Cowbird.

Conclusions

If we calculate on the basis of the 255 eggs that should have been laid in the sixty-one nests, we find that 38 per cent of eggs or young were eaten by enemies, 3.5 per cent carried off by boys; 5 per cent lost through Cowbirds; another 5 per cent through parental inefficiency; while 8.6 per cent (six nests) were deserted. Four or five of these last disasters were due to the death of the incubating bird. The worst enemies of the adults I believe are boys and cats; of the young, rats and cats.

The high mortality of the adults during the breeding season was unexpected, and the number of failures was often disheartening. But the period between leaving the nest and attaining independence showed

a marked degree of success. Another season might show more attempts at nesting, but greater mortality.

COLUMBUS, OHIO.

NOTES ON THE SONG AND TERRITORIAL HABITS OF BULLOCK'S ORIOLE

BY ALDEN H. MILLER

Possibly there are many students of birds who have noted the song of the female Bullock's Oriole, but it would appear from a perusal of the general accounts of the natural history of this species as set forth in the better known manuals of American ornithology that the female *Icterus bullocki* is not given proper credit as a singer. Primarily to correct this impression regarding song a short and unfortunately fragmentary observational record of two pairs of Bullock's Orioles is presented here. The songs of female orioles of other species, as for example, *I. galbula*, in some cases are well known.

In the vicinity of Pinole, Contra Costa County, California, in the winter and spring of 1930, several California Loggerhead Shrikes were under my observation for a period of six months. Incidental to this study of the shrikes other bird species came to my notice, among them several pairs of orioles. The region studied consisted of an open pasture with a number of steep-banked ravines cutting through it (see figure 14). Willows were the principal trees although a few cottonwoods, live oaks, valley oaks, and buckeye trees were present. The grass in the pasture did not attain a height of more than fifteen inches during the 1930 season. A few low tangles of rose bushes were present in the bottoms of the ravines.

Male orioles had arrived in the region under consideration on March 27, 1930, and were in full territorial song. These birds were not present on a previous visit on March 24. Songs of two males were recorded on this date at 7:45 in the morning, the method used being that employed by A. A. Saunders (New York State Museum Handbook 7, 1929, p. 140), except that absolute pitch was not recorded. The two songs were identical and could not be distinguished from songs, probably of the same males, that were uttered a month later on the same territories. On March 27 one male occupied the line of willows, territory B, to the west of the bridge shown in figures 14 and 15, while the other male occupied the two clumps of willows east of the bridge, territory A. These males were not followed closely by me at this time but each appeared to have established possession of

a territory as indicated. The male of territory B sang most frequently from the tree in which later the nest was located (nest site marked by B in figure 15). The male of territory A sang either from the trees marked 1 or at the point A where the nest of this bird later was built.

On April 16 female orioles were noted but it is believed that they were present several days earlier. Notable actions of the females were not observed until the morning of April 25 when both males A

FIG. 14. View looking north across the territories occupied by two pairs of *Icterus bullocki* near Pinole, Contra Costa County, California. Photo-taken April 30, 1930.

and B were paired and the pair A appeared to be attempting an invasion of the territory of pair B. Although the possibiilty of confusing female and first-year male Bullock's Orioles is great, the obviously mated condition of these pairs of birds made it certain that the two dull-colored individuals were females. The two males were in full adult plumage. Members of a pair were almost constantly in close company, often being within two feet of one another.

At 9 A. M. on April 25 my attention first was drawn to pair A which, the female leading in flight by a few feet, attempted to alight in the tree marked 2 which was next to the singing post of male B. The males hovered and screeched near one another and the pair A

then left the tree and came to rest on the east railing of the bridge. Once having alighted here, female A began to beg of male A and pursue him along the railing of the bridge, fluttering her wings, posturing occasionally, and uttering a low *clu-r-r* of unusually clear quality for this species. The male was pursued in this manner for a few feet when female B came to the railing and darting at female A drove her from the bridge and thereafter pursued and begged of male A in identically the same fashion as had female A. In the meantime male B was singing at short intervals from the top of the tree at 2. When female B had pursued male A to the end of the bridge, male A flew to the grassy slope of the ravine and there was joined by female A. Female B returned to a perch in the trees near male B.

While pair A was on the ground on the ravine slope, female A stood erect and sang the song (♀A) recorded in figure 16. This song was repeated at least six times before the pair flew to the tree at A. In the trees the male sang the song (♂A) represented in the figure, the female roughly alternating with her somewhat different song.

For a period of one hour repeated attempts at invasion of territory B by pair A were witnessed. At least ten such attempts were seen. The behavior of the birds was in general the same each time although with a few significant differences. Female A usually flew in advance of male A as this pair attempted to invade the tree at 2. On two occasions the repulsion of pair A involved all four birds, the two males fighting one another and the two females fighting one another in the short grass at the south end of the bridge. Female B repeatedly was excited by the begging of female A and by the presence of male A and was successful in driving away female A and in begging from male A herself. Female B courted male A only when male A was near the bridge; she did not follow him into his territory east of the bridge. Female B several times begged from male B in the tree at 2 but details of her actions were obscured by the foliage. In several instances females A and B simultaneously pursued and courted male A. Only once was female A able to withstand the attack of female B and continue to pursue male A along the bridge railing unmolested. During my observations on this day I was located at the point marked X.

The songs of the two females were not identical as may be seen in figure 16, yet they both were easily distinguishable from the songs of the males. The songs of the two males always were extremely similar one to the other. The females sang repeatedly from the ground

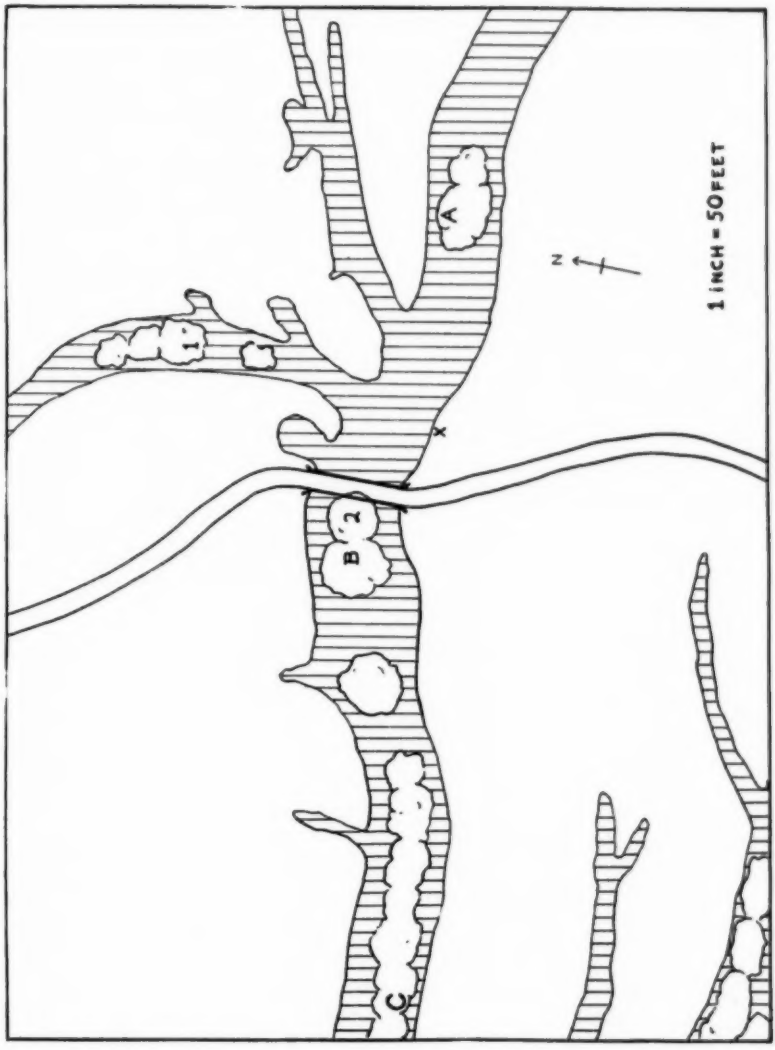

FIG. 15. Sketch map of territories of *Icterus bullocki* shown in figure 14. Shaded areas indicate ravines.

whereas the males with one or two exceptions sang only while in the trees. The females sang in the trees near their respective males. In pair A it was estimated that during the hour from 9 to 10 A. M. the female sang five times as often as did the male. In pair B the female sang slightly less frequently than did the male.

On May 27 the two nests of these pairs were located. The nest of pair A was situated on the north side of the willows at A, eight feet above the ground and contained young estimated to be about three days old. The pair B had built a nest twenty-five feet above the ground in the crown of the tree at B. This nest contained four young between ten and twelve days of age. The nest of pair B was larger and more neatly fashioned at the top than was the nest of pair A. From the findings on this day it may be supposed that on April 25 the orioles were beginning or contemplating nest construction. Pair B was about one week more advanced than pair A.

No singing was noted on May 27 although both members of each pair appeared at their respective nests and scolded as I inspected their young. Pair A in their foraging did not attempt to pass west of the bridge and invade the territory of pair B. Apparently pair B had been successful ultimately in defending the area west of the bridge. On this day a third pair and nest was found at the point C.

Concluding and summarizing from these observations, the male Bullock's Oriole arrives on the breeding ground before the female and establishes a singing post, perhaps the entire territory. The females arrive one to two weeks later and come to occupy a territory jointly with a male. The female shares in the defence of territory and perhaps, as seen in pair A, may be responsible for attempted, and doubtless sometimes successful, alterations in the outlines of the territory. In the case of territory A it appears to me that there were relatively few trees present in which to forage and that this circumstance may have led to the impulse to annex the trees at 2. The male and female of a pair do not coöperate completely in the defence of territory at least at a time before the nest is built. That is, a female during this period possesses an urge to defend a territory to the exclusion of other females, the male to the exclusion of other males. Other males during or preceding nest building are not repulsed from the territory by the female but instead may be acceptable to the female and may be courted. The converse doubtless is true of the male at other periods in the breeding season. Certainly the male before nest construction is tolerant of two females within his territory. At the beginning of nest construction the females pursue and beg from

the males, posturing, fluttering the wings, and singing. At this time the males appear to be passive, and consistently move away from the advances of the females. Nevertheless, in flight the males may follow after the females. The difference in the aggressiveness of the two females A and B on April 25 may have been due to a more ad-

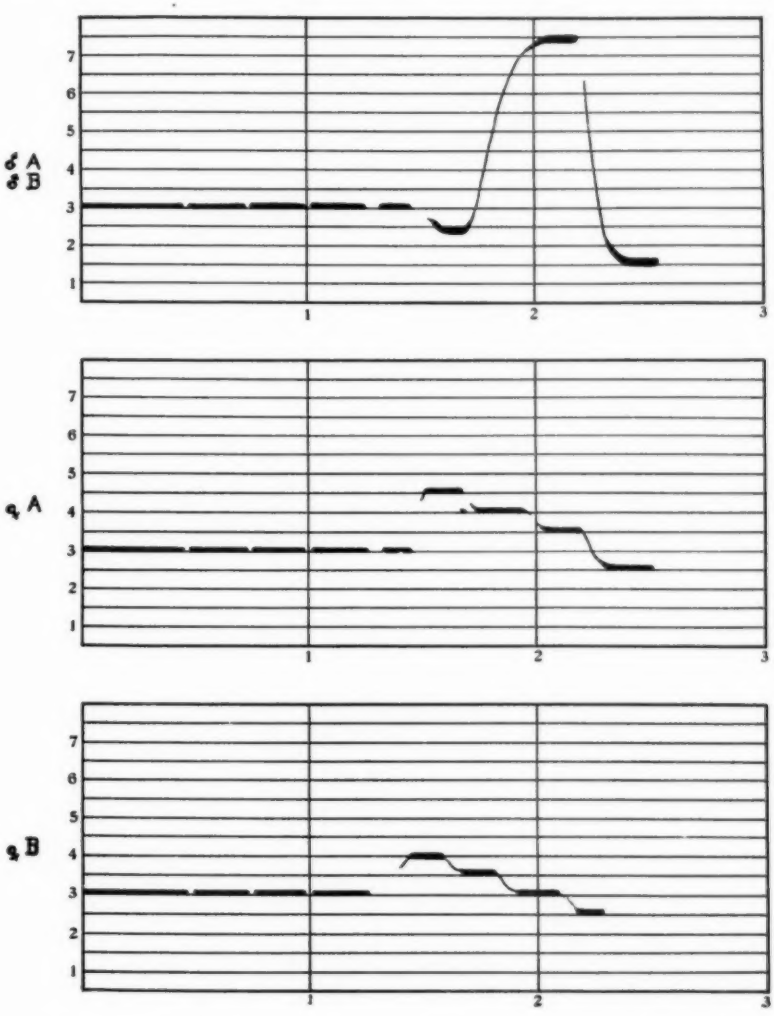

FIG. 16. Graphical representations of songs of *Icterus bullocki* recorded on territories A and B near Pinole, Contra Costa County, California, between 9 and 10 A. M. on April 25, 1930. Numbers on vertical axis indicate whole tones of pitch (absolute pitch not recorded); numbers on horizontal axis indicate seconds of time.

vanced sexual and territorial cycle of behavior in female B as evidenced by the greater age of her young on May 27.

The utterances of female Bullock's Orioles while in defence of territory and in association with males in every way are comparable to the songs of males and may be considered as true territorial songs. The song of the female is similar to that of the male in rhythm, pitch, and quality except as regards the concluding notes of the song which in the female are slightly harsher in quality, range over lesser intervals of pitch and show important modifications of the rhythm as compared with those of the male. Before or during nest building the songs of females on occasion may be even more abundant than the songs of the males.

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THE STATUS OF THE GOSHAWK IN PENNSYLVANIA

BY GEORGE MIKSCH SUTTON

Ornithologists have for years regarded the American Goshawk (*Astur a. atricapillus*) as a rare and irregular visitor during the winter months in Pennsylvania. Occasional remarkable invasions have been noted, of course, such as those which occurred during 1905 and 1907, and from November, 1926, to March, 1927, when the species was very abundant (*Cardinal*, Vol. II, No. 2, July, 1927, 35). It appears from recent investigations, however, that the Goshawk is at least locally a fairly common and regular late fall migrant or winter visitor in this Commonwealth.

Prior to personal observation and study of the remarkable hawk migration which takes place each fall at Blue Mountain, near Drehersville, Schuylkill County, it was noted that Goshawks were always mentioned among the birds of prey regularly observed in this region. It was believed at the time that those who made this report did not know the Goshawk, since the average hunter does not, as a rule, accurately distinguish the several members of the hawk tribe. On October 19, 1927, however, four Goshawks were killed at Blue Mountain. On October 22, sixteen more were killed, of the fifty or more that were seen; and these birds were not, apparently, part of an unusual invasion such as had occurred during the preceding fall. The hunters of the region recognized the birds as Goshawks at once, and were surprised to learn that their regular occurrence there was considered unusual. They sometimes called the birds "Gray Hawks," because the finely

barred underparts present, at a distance, a gray appearance. A little inquiry brought to light the fact that sixty-seven Goshawks had been killed at this mountain on one afternoon in mid-November, 1926, by one hunter. This, of course, happened during the height of an unusual invasion. The hawk-shooters near Drehersville state that Goshawks have been noted every late fall and winter for the past forty years, and that while they are not, as a rule, common in the region, they are not distinctly rare as are the Rough-legged and Duck Hawks, which sometimes occur.

Goshawks are not usually seen at Drehersville before November and sometimes not until late in the month. They do not linger in the region but continue flying on to the southward. It is remarkable that they have not been noted elsewhere, since they must winter somewhere

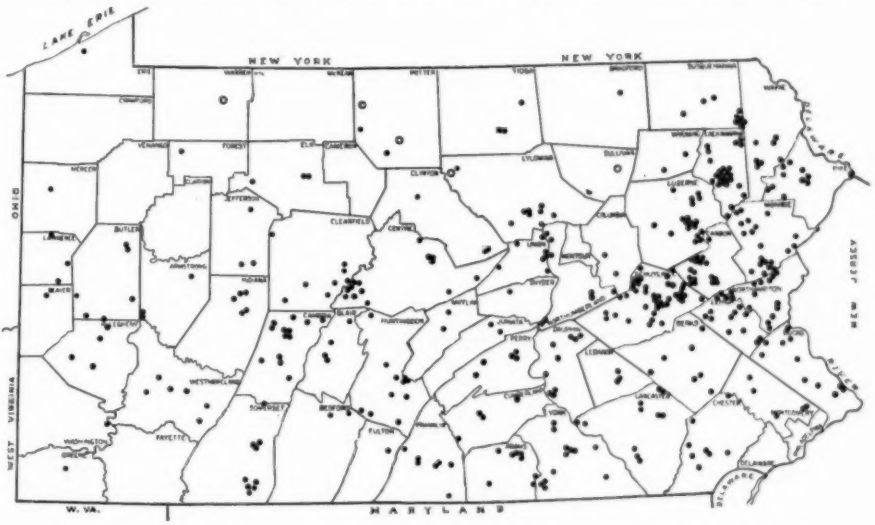

FIG. 17. Map of Pennsylvania showing the Goshawk invasion of 1926-27. (This cut is used by courtesy of the *Cardinal*).

in the region south of Schuylkill County. Apparently they arrive at Drehersville more or less in a body and then separate as they move on to the south and west. There probably is much variation from year to year in the number of birds which pass along Blue Mountain.

Knowledge of the status of this species in Schuylkill County, together with continued reports from many parts of the Commonwealth concerning the depradations of Goshawks to game and poultry during the winter of 1927-28, incited interest in a special investigation similar to that made during the preceding winter, and Goshawks were again found to be present in considerable numbers throughout Pennsylvania.

It is not probable that many of the 1927-28 birds were the same individuals which visited the State in 1926-27, though there is a possibility that birds which found abundant food during the former year returned, bringing with them their hungry fellows.

On the accompanying maps are plotted the Goshawk records for the winter of 1926-27 and of 1927-28. Examination of these brings to light some interesting facts: first, that the total number of records for 1927-28 is not much smaller than that for 1926-27, yet no special invasion is thought to have occurred during the more recent year. It may be that the great interest of taxidermists, sportsmen, and game protectors has something to do with the number of records accumulated during 1927-28, since much discussion was aroused by the abundance of the birds during the preceding year; second, that certain counties in eastern Pennsylvania have numerous records during both years, and that many counties, such as Fayette, Crawford, and Tioga, have very few records for either year. While this absence of records may be due partly to actual scarcity of birds, it is also partly due to the unpopularity or inaccessibility of certain sections as gunning grounds, though not, necessarily, to the scarcity of game, since small game, such as is killed by the Goshawk, is well distributed throughout the Commonwealth.

In a general way the 1927-28 invasion, if we may so refer to it, was much more extensive than that of the preceding year. Comparatively more birds were found in the central and western counties, notably so in Huntingdon, Somerset, and Forest Counties. The two maps clearly show, it appears to me, that the birds regularly come into Pennsylvania at about the northeastern corner. Evidently they follow a fairly well defined course southward, probably along one of the ridges of the Alleghanies. Upon reaching the latitude of Blue Mountain, Schuylkill County, most of them do not continue to fly directly southward but veer off to the west as far as northern Dauphin County, and then continue south and west. This procedure is more evident in the 1927-28 map than in that for the former winter.

It is reasonable to assume that the abundance of Goshawks in Pennsylvania during 1927-28 indicates a continued shortage of food supply in the North Country, though it may be that the migratory habit is more quickly revived or developed than we have supposed and that birds which move southward during one winter repeat their migration merely through the more or less involuntary following of a racial tendency to move southward toward an ancestral home with the advent of cold weather.

During the 1926-27 season, 424 of the six hundred or more Goshawk records were established as reasonably authentic; during the following year 349 records were gathered. Most of these records are of birds which were shot. A few sight records were considered authentic, and several birds were trapped. The precursors of the 1927-28 migration appeared in September and October. Three September records are all from northern counties so there is a possibility that these birds were locally nesting individuals: on September 15, Mr. Edward Shaw took a female in central Forest County; on September 18, Mrs.

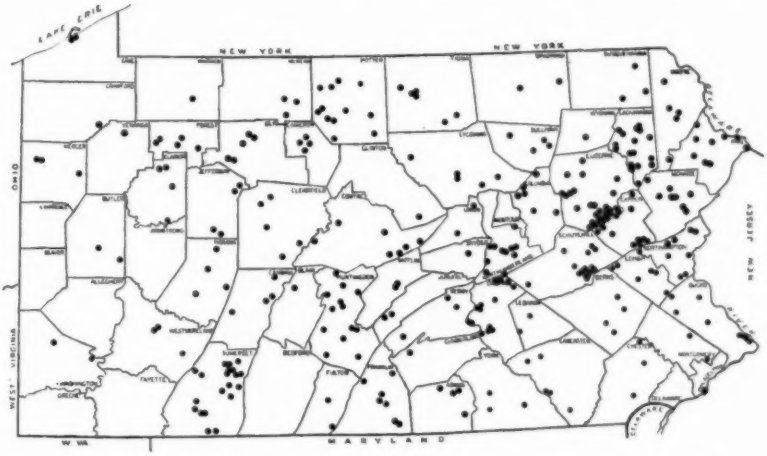

Fig. 18. Map of Pennsylvania showing the Goshawk invasion of 1927-28.

P. Banner caught a male in a steel trap, near Rowland, Pike County; and on September 25, Mr. John H. Lohmann, Jr., saw one in Dark Swamp, Pike County.

The October records indicate that no Goshawks had yet reached the southern tier of counties; by the middle of the month they had come to Schuylkill County, however, and they continued to arrive in great numbers. October records are scattered through Luzerne, Forest, Sullivan, Lehigh, Schuylkill, Northumberland, Lackawanna, Huntingdon, Indiana, and Dauphin Counties, indicating that by this date the birds had scattered considerably to the westward—or, perhaps, that some of them had come directly south or southwest across New York.

By early November the southernmost counties were reached, birds being recorded as follows: Chambersburg, Franklin County, November 1; western York County, November 5; Parker Ford, Chester County, November 7; York Springs, Adams County, November 11; and Benton, Lancaster County, November 17. No Goshawks were taken in

Somerset County before January, 1928, suggesting that the migration westward was gradual. Lack of records from Bedford County has not been satisfactorily explained.

By far the greatest number of records were made during November, 1927, while the hunting season was on. Goshawks were taken during this month in almost every county where any records were made, thirteen birds having been taken in eleven different counties on November 1.

Twenty-three birds were taken in December, and thirty-one in January, 1928. Twenty-seven were taken in February from all parts of the State, these records not indicating any withdrawal of the hawks to the northward. The eleven March records are chiefly from central or northern counties, it is true, but this does not necessarily indicate a northward movement.

The 1927-28 invasion extended into the spring much later than did that of the preceding year, when only five records were made during February, the latest being February 23, 1927, Osceola Mills, Clearfield County. This lingering of the birds was perhaps due to the protraction of cold weather during the spring of 1928, and doubtless also to the continued abundance of food supply.

All of the specimens secured during the winter of 1927-28 were in adult plumage save one, an immature female *with red eyes*, taken November 17, 1927, at Emporium, Cameron County, by Mr. Arthur G. Logue. Among the specimens whose sex was determined it was found that males and females occurred in about equal numbers.

Of the 349 records which we believe to be authentic, twenty-eight were ocular records. The stomachs of fifty-six specimens taken were not examined by the taxidermists who skinned them. Of the 266 stomachs examined, sixty-one were empty. In the 205 stomachs and crops which contained food, some of them holding the remains of two or more creatures, were found flesh, feathers, fur, or bones of the following: 81 Ruffed Grouse (*Bonasa umbellus*); 55 cottontail rabbits (*Sylvilagus floridanus*), 29 domestic chickens, including several White Leghorns, a Rhode Island Red hen, and a Barred Plymouth Rock rooster; 16 Bob-Whites (*Colinus virginianus*); 13 Ring-necked Pheasants (*Phasianus colchicus*); 10 gray squirrels (*Sciurus carolinensis*), one of the black phase; 3 red squirrels (*Sciurus hudsonicus*); 2 chipmunks (*Tamias striatus*); 2 white-footed mice (*Peromyscus* sp.); 1 domestic pigeon; 1 Meadowlark (*Sturnella magna*); 1 Cardinal (*Richmondena cardinalis*); 1 Song Sparrow (*Melospiza melodia*); and 8

small birds the species of which were not determined. Three contained unidentifiable flesh and fur. Three stomachs each held the remains of two Ruffed Grouse; one, a Bob-White and a cottontail; one, a chicken and a cottontail, and so on. Six birds which were killed while attacking poultry, or pursuing prey, had much food in their stomachs. Eight birds were killed while chasing or killing poultry, two while killing grouse, and two while chasing squirrels. Three birds were killed while carrying prey a few feet above the ground: one, a female, was carrying a large Rhode Island Red hen; one, a full grown cottontail; one, a young cottontail; one, a grouse. Many of the birds which had eaten grouse and Bob-whites had swallowed the feet *entire*, and mandibles were also found in almost every case. Not many feathers were found in the stomachs—evidence that Goshawks pluck their prey rather carefully before eating it. The crop alone of one individual held over twelve ounces of grouse flesh. One male, shot by Mr. Charles Mack, on February 14, 1928, at Slatington, Lehigh County, is thought to have killed twelve hens before it was captured.

During the winter of 1928-1929, very few Goshawks were noted anywhere in Pennsylvania. According to the records of the Game Commission at Harrisburg, only seven sight records of the species were made, and no specimens were taken. During the following winter, however, the species was noticeably commoner. Seventy-six specimens were received for bounty payment at the Game Commission office in Harrisburg, and twelve sight records were found to be authentic. During the recent winter (1930-1931), twenty-eight specimens were received for bounty payment at Harrisburg, and three sight records were authenticated.

Summing up our knowledge of this species in Pennsylvania, we may regard it as a rare summer resident of the more northern, mountainous counties, individuals which nest doubtless remaining throughout the year in one locality so long as food is available; as a regular late fall migrant in the region of Blue Mountain, Schuylkill County, and perhaps elsewhere; and as an irregular winter resident, sometimes abundant, and apparently becoming somewhat more regular of late years.

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BIRDS OF SOUTHERN LOUISIANA

BY ALFRED M. BAILEY AND EARL G. WRIGHT

Photographs by Alfred M. Bailey.

The coastal marshes of Louisiana are well known for their abundant bird life; thousands of waterfowl migrate down the Mississippi Valley each fall and spend the winter on the wide-stretching savannahs, and, then, when they have departed in the spring for their northern breeding grounds, their places are taken by species which wintered in Central and South America. There are many resident forms also, so all in all, the lowlands bordering the Gulf of Mexico are ideal for bird study.

The region under consideration in this paper includes the off-shore sand and shell islands and the great stretch of territory bordering the gulf from the Texas border to the state of Mississippi; for convenience we may use the Southern Pacific Railway, which extends westward across the state of Louisiana from New Orleans, as our northern boundary line. In this vast area we have marsh land with occasional high knolls (known as "islands") and extensive flat regions bordering the marsh, which in dry seasons would be known as "prairie." The region is diversified, and conditions are suitable for many different species of birds; we have offshore islands for terns and gulls, typical marsh country for wintering or breeding waterfowl; miles of swamps for woodland species; and lastly, high wooded knolls. As would naturally be expected, it is an interesting field for the naturalist, but owing to the fact that transportation presents a serious problem, the average student can not expect to cover the entire region except in the course of many years' work.

Louisiana is fortunate in possessing three great areas which have been set aside as sanctuaries for bird life. Mr. E. A. McIlhenny, of Avery Island, has been the leader in this work, and was instrumental in having the land deeded to the state. The three reserves have a total acreage of 174,664 acres, and are known as the Louisiana Wild Life Sanctuary, Marsh Island Refuge, and the Rockefeller Foundation Wild Life Refuge. In addition to these lands, there is the Paul Rainey Reserve, under charge of the National Audubon Society, in Vermilion Parish, a region of 150,000 or more acres, which is privately owned. Another area of marsh land, in Cameron Parish, owned and protected by Mr. H. J. Lutcher Stark, is one of the most important wintering grounds in Louisiana, and while it is in safe hands in Mr. Stark's care, it should be purchased and set aside for all time under the protection of the state or national government. Then, Louisiana would have a

network of reserves extending from the Texas border, over half way toward the Mississippi River.

The majority of the islands used by sea birds for rearing their young, extend from the mouth of the Mississippi northward toward the Mississippi state line. There are many of these little shell keys, the most important being grouped together in a series known as the Chandeleur Islands. At the south end of this chain we find Breton Island, some five miles in length, and at the other end, as might be expected, is North Island. In between, we find Grand Gosier, Tern, and Errol Islands, as well as many others, on which are found sea birds of several species. Royal and Cabot Terns, Laughing Gulls, skimmers, and Brown Pelicans are the most numerous, while Caspian, Forster's, and Least Terns nest in smaller numbers. The mud lumps at the mouth of the Mississippi River are also well known as the breeding grounds of thousands of pelicans.

The region about the mouth of the Mississippi is ideal for the study of water birds, and one of the stations covered in this article is the north side of Main Pass. Through the courtesy of Messrs. Joseph Leiter and Eugene R. Pike, two weeks were spent in October, 1928, with headquarters at "Chateau Canard" and photographs made of the ducks and thousands of geese which were arriving from their breeding grounds.

Centrally located in the state, along the Gulf of Mexico, are the State Wild Life, Marsh Island, and Paul Rainey Reserves, while bordering the gulf is a wonderful strip of live-oak woods extending for about five miles, which is known as Chenier au Tigre (oak ridge of the tiger). The winter bird life of the Chenier has been covered in the *Auk* (Volume XLV, July, 1928), and the reader is referred to that paper for a more extensive description of the area. North of this section, across Vermilion Bay, is a series of high knolls rising 100 to 150 feet above ths sea, which are known as islands. The most important of these is Avery Island, one of the finest places in the south to observe bird life. This is the home of Mr. E. A. McIlhenny, and it is unique—there is no better example of what can be accomplished in matters of conservation. Mr. McIlhenny has written an interesting paper, "How I Made a Bird City," which was published in Country Life in America, and which gives in detail what we have summarized briefly below.

There are several ponds on the island, and one of them, Willow Pond, was made in 1894 by damming a small creek which meandered among the hills. At this time, many species of our beautiful birds

were threatened with extermination, due to the demand for their feathers and plumes for millinery trade. The Snowy Egret was one of the most persecuted, and Mr. McIlhenny thought it might be possible to attract birds of this species to his pond where they would be safe to breed. Eight young were taken from their nests in the nearby marsh, kept in captivity along Willow Pond, and handled every day, so they became very tame. Then in the fall the birds were liberated. They remained about for a few days, then joined the other migrating birds and left, presumably, for South America. On the 18th of March following, four birds returned to the pond, and two days later two more arrived. One disappeared after a few days, so five birds remained and two pairs nested. Eight young were hatched, and all survived to go south with the five adults—"all left on the same night, the 17th of November". The birds returned year after year, other species joined the Snowy Egrets, so we now find Louisiana, Little Blue, Green, and Snowy Herons crowding the bushes; Anhingas build their heavy nests in the cypresses and willows, and gallinules, among the low growing plants.

Avery Island is not a remote place, far off from civilization; on the contrary, it is one of the show places of southern Louisiana, about ten miles below New Iberia, and connected with the Southern Pacific by the Salt Mine Railway, and also by an excellent shell road. The trains run within thirty feet of the heronry, and the birds pay no attention to the passing traffic. The same birds, however, will not allow one to approach within a hundred yards of them, out in the open marsh, and when they fly from their breeding ponds for their feeding grounds, they trek high in the air. It is a wonderful sight just at dusk, when the incoming birds are returning to their nests; they fly high—a continuous chain of birds coming from the grayness—until they are over the pond; then they tumble on set and whistling wings, performing gymnastics which make one dizzy to watch. Avery Island has many other advantages for the bird student, however, for there are high hills, cultivated fields, extensive marshes, and nearby swamps with heavy growths of cypress, tupelo, and gum, so all in all, it is an attractive region for study.

Cameron Parish, in the southwest corner of the state, is another important place from the point of view of the naturalist. Through the courtesy of Captain William E. Lea and Mr. H. J. Lutcher Stark, we have made many trips to the region. It is totally different from Avery Island, but just as interesting in other ways, for we find forms in the west which are lacking in the latter place. This is the last

FIG. 19. Along Black Bayou, Cameron Parish.

FIG. 20. Live Oaks and Palmettos.

bird, and after the breeding season, one will often find the solemn-stronghold of the Roseate Spoonbill; the American Egret is a common faced Wood Ibis lining the shores of lagoons. There are two distinct areas; just below the intercoastal canal is an expanse of prairie which, in normal years, is comparatively dry, while to the south, and extending to the gulf is typical marsh land. The usual ridges are found along the gulf, so conditions are favorable for both land and water birds. The marsh is one of the finest wintering grounds for wild fowl in the south, for there seems to be an abundant food supply, as well as wide-stretching, impassable areas which offer places of refuge.

This paper covers intermittent observations over the past fifteen years; it is not intended as a list of the birds of the region, but rather of those actually observed by the writers. We have made no effort to compile life history notes, but we have tried to give specific dates for the occurrence of species which are not so common as to make such records superfluous. The majority of the field notes are from the various trips made by the senior author in the interests of the Louisiana State Museum in 1916-19; November and December, 1925, for the Colorado Museum of Natural History; and, October, 1928, for the Chicago Academy of Sciences. Another trip was made for the Chicago Academy of Sciences in 1930, with Earl G. Wright, Francis R. Dickinson, and E. V. Komarek as other members of the party. Headquarters were made at Avery Island in May, and the many places of interest—Chenier au Tigre, Marsh Island, and Mr. Stark's estate in Cameron Parish were visited; and then, the second week in June, work was carried on among the bird islands off the east coast, with visits made at the "mud lumps," Breton, Tern, Brush, and North Islands, as well as less well-marked places.

Messrs. Francis R. Dickinson and A. M. Bailey spent an additional two weeks in March, 1931, making observations on Marsh Island, Chenier au Tigre, and in Cameron Parish. This is the "betwixt and between" season, when the majority of the wintering birds are still found in numbers, and some of the migrants are arriving from South and Central America.

The recent trips were made to secure motion films of Louisiana wild life for the film library of the Academy, and we are greatly indebted to many individuals for their coöperation—not only during these expeditions, but in others of past years. We wish to acknowledge our indebtedness to Mr. Robert Maestri, Commissioner of Conservation, and Mr. Armand P. Daspit, in charge of the Wild Life Division of the Department, for their coöperation; the resources of the

Department of Conservation, their boats and personnel, were placed at our disposal, and made possible much more extensive work than otherwise would have been practical. As was mentioned before, Mr. E. A McIlhenny, Mr. Lutcher Stark, and Capt. William E. Lea aided in every way, furnished quarters and boats, built blinds, and gave us the services of their men. We also wish to acknowledge the kindness of Dr. Robert Glenk, who has always coöperated in our field work, and the members of the staff of the Department of Conservation of the present and the past administrations, Mr. Stanley C. Arthur, Mr. Percy Viosca, and Mr. E. S. Hopkins, and Mr. and Mrs. Simms Sagrera, our hosts on many trips to Chenier au Tigre.

Owing to the fact that the majority of the field trips were made to secure exhibit material for museums, the small, inconspicuous birds were neglected, and many opportunities to make valuable observations were lost. Mr. H. H. Kopman has made more extensive observations on the perching birds, and the reader is refer d to his article which was published in the *Auk*, as listed below.

We have regretted the preparing of this paper before the new check-list has made its appearance, but for convenience, we have followed the order of the third edition. It has been impossible for the writers to keep informed on the latest scientific names; probably this paper should have been submitted to an authority for his suggestions, but we realized that other names would be changed before the article could be published. We feel apologetic that with the opportunities we have had, we have failed to observe and record many species, especially the smaller forms, which are probably abundant at various seasons, and we believe that any observer will be able to make many additions to our list.

Horned Grebe. *Colymbus auritus.* The Horned Grebe is not common. It occurs in small flocks during the winter months, on the larger lagoons and lakes near the Gulf Coast. A few were observed daily on Vermilion Bay, the middle of November, 1917, and all were in the gray-and-white winter dress. One specimen was collected.

Pied-billed Grebe. *Podilymbus podiceps.* A common species on fresh water or slightly brackish lagoons during the fall and winter months. Its distribution is general along the coast at this season of the year. It was especially common in the marshes along Main Pass, at the mouth of the Mississippi River during the latter part of October, 1928, and was observed in Cameron Parish, in the western part, during November of the same year. This species is recorded as a resident, but we have failed to find it at other seasons.

Loon. *Gavia immer.* Occurs during the winter, but never observed abundantly. One was collected on Vermilion Bay in winter plumage, November 19, 1916, and a few others noted; from one to a dozen were seen on each trip along the coastal marshes. They were fairly common in the Mississippi Sound in March, 1918, when many high-plumaged birds were seen.

Herring Gull. *Larus argentatus smithsonianus.* Many of these large gulls are found along the Mississippi River and the Gulf Coast during the winter months. They are irregular in their habits, for sometimes they are very numerous, and at other times there are few to be seen, probably due to the food supply. As in other parts of the country, the Herring Gull will be found about the water fronts of the cities where they feed upon refuse. They are present from the latter part of October until the first part of April. Several were collected at Chenier au Tigre, March 6, 1918.

Ring-billed Gull. *Larus delawarensis.* This is the most common of the gulls found along the coast during the winter, and it was observed on every trip. Flocks of them worked along the beaches and the lagoons at Chenier au Tigre during the early part of March, 1918, and they were common during January, 1919. On December 12, 1925, a flock of 200 was observed cruising against the wind.

Laughing Gull. *Larus atricilla.* These gulls are found at all seasons of the year, but they are often scarce during the cold days of winter. They are the only gulls which nest along the Gulf Coast, and they are extremely common during the nesting season. The Laughing Gulls prefer to hide their nests upon the ground among the coarse grasses, wax myrtles, and water oaks of the offshore islands, and while they are community dwellers, their well constructed nests are usually some distance apart. They have from three to four greenish eggs which are spotted with black. The downy chicks are brownish in color, and when an intruder appears they quickly leave the nest and hide in the dense vegetation. Several hundred birds will often nest upon the same little island, and when disturbed they rise out of the grass and hover overhead, all of them calling and shrieking their displeasure. As is the case with most gulls, they are more or less predaceous, and seize every opportunity to plunder the nests of other birds. They are fast fliers, light of wing and keen of eye, and as they scan the waves, they inspect every little object; it is a common sight to see hundreds sailing along after a fishing boat, waiting for refuse to be thrown overboard.

FIG. 21. Royal and Cabot's Terns, at Chandeleur Islands.

FIG. 22. Cabot's Terns and young.

Franklin's Gull. *Larus franklini.* Several bands of gulls were noted flying from the north, the first week in November, 1917, at Avery Island. They flew in rather compact flocks, as though in migration, and Mr. E. A. McIlhenny identified them as this species. He stated that he had had considerable experience with this form. No specimens were taken, and we do not know of a Louisiana record, although we may have seen many and mistaken them for the preceding form.

Gull-billed Tern. *Gelochelidon nilotica.* These terns were encountered on but three occasions, in spite of many trips along the coast at all seasons of the year. Four birds were observed at Chenier au Tigre March 6, 1918, and one collected; another was taken at the same place, January 21, 1919, and several were observed October 22, 1928, at Main Pass, at the mouth of the Mississippi River.

Caspian Tern. *Sterna caspia.* This tern is a resident, and is common among the low islands along the eastern coast. It nests on the ground in company with the Royal and Cabot's Terns, but it is not so numerous. The two large eggs are laid in a depression in the ground shell. They were nesting on Timbalier Island, June 14, 1918, and many were seen on Lost Island, December 8, 1918. Thirty-five nests were counted on one of the "mud lumps" at the mouth of the Mississippi River, June 1, 1917, and a week later, fifty pairs were found nesting on Free Mason Keys. They were observed June 7 to 13, 1930, on the mud lumps, and on Tern Island. The Caspian Terns refused to return to their eggs at the mud lumps when we attempted to photograph them. We saw turnstones breaking the tern eggs and eating them.

Royal Tern. *Sterna maxima.* This is the most common of terns, and while it is found at all seasons of the year, the majority migrate southward during the winter. They are well named, for they are large, strong-winged birds with dark, keen eyes, and heavy, capable build, and they strut about their nesting island with crests erect, in a fearless manner. They nest on many of the "outside" islands along the east coast, although the colonies are changed from year to year. Errol, Grand Gosier, Breton, Hog, Battledore, and Brush Islands are a few of the places where we have found large colonies in years past. This past season we did not find them nesting on Breton or Grand Gosier, but on Tern Island, a low lying spit, there were fully 7500 pairs of Royal and Cabot's Terns nesting in the two colonies. What a sight for the bird photographer! From the distance they looked like shimmering snow fields. A great flock of Man-o'-war-birds circled over-

head, and bands of shrieking terns rose from their eggs and flew to meet us. The two colonies of terns were about half a mile apart, and while Bailey made motion films of the larger flock, Wright and Komarek counted the eggs in the smaller. There were 2400 Royal and Cabots' Tern eggs, the Royal being more abundant than the Cabot's. The terns usually lay but one egg each along the Louisiana Gulf Coast, although many sets of two were observed. The eggs are deposited in shallow depressions in the sand or shell, and both adults share the task of incubation. They are variously mottled and of many sizes, and the young are just as varied in their coloration. Some are pure white, others are brown, with all degrees of shades between the two extremes. Many of the young have orange legs and feet, while others are brownish black. All the young terns, Royal, Cabot's, and Caspian, have similar habits, and it is usual to see whole rafts of these little birds swimming parallel to their island, and they often swim far to sea. We were greatly mystified to hear a clear, whistlelike note, on one occasion, and we tried to locate the source of the sound; it came clear and resonant, but seemed to come from no particular direction. We finally discovered it was made by a young Caspian Tern far out in the gulf—the call to its parents. It is interesting to see the old birds guide the young back to shore after they feel the danger is over. They circle overhead, scold and scream, and then fly toward land, circling back repeatedly as they coax the youngsters along.

Cabot's Tern. *Sterna sandvicensis acuflavida.* These terns are smaller than the Royal Terns, and nest with them in perfect harmony—if the constant bedlam for which these colonies are noted, can be called harmony. They are beautiful little fellows, silver pearl of wing, and white with rose-washed underparts. Their eyes are dark, and they have black crests which they erect when excited; they are more fearless than the Royal Terns, and seem to take better care of their young. Although they nest in the same colonies with the Royal Tern, they are not so numerous. On Tern Island, there were two nests of the Royal Tern for each one of the Cabot's Tern, and the percentage seems to hold in other colonies. The nesting season varies from the first of June until well into July. We have found the terns with downy young the first week in June, one season, while another year there were no young until July. Many times the entire colony is wiped out by high water, and it is no unusual sight to see eggs washed in windrows. This past season was a late one, for young terns were found on Brush Island only, during the first two weeks of June. On some islands the terns

had not started to nest, while on others we found fresh eggs only. On Brush, however, the downy chicks of Cabot's and Royal Terns were making their appearances, and at one edge of the main colony, along the beach where the waves had piled the shell, was a little group of Cabot's. When we approached too closely, they stretched their necks to full length, with crests erect, and protested at the top of their voices, and then, when a step nearer, they raised and drifted gracefully away, and then circled in against the wind and fluttered down to protect their youngsters from the hot sun. One adult tried to coax her little one over the rim of the beach to the water's edge. She would go ahead a few steps, teasing and scolding, and then go back, as though out of patience with the wayward child. This species has been listed as a resident, but Bailey has failed to record it on his numerous coastal trips during the winter months.

Forster's Tern. *Sterna forsteri.* These terns are common summer residents, and they nest abundantly along the coastal marshes and islands east of the Mississippi River. They nest upon drift which has been stranded by the high tides, and make a rather bulky nest of grass in which are deposited the three greenish or brownish eggs. They are characteristic birds of the marshes, and we have never found them nesting upon the gravel, or associated with other species of terns. While a few of this species winter along the Gulf Coast, by far the majority migrate southward. They were common at the mouth of the Mississippi, October 25, 1928. Among the small terns which are seen over the sheltered bays during winter months, some are undoubtedly Common Terns, but we have no definite record of their occurrence.

Least Tern. *Sterna antillarum.* This small tern is becoming abundant among the shell islands off the east coast where it nests in colonies. It was practically exterminated in this region, along with other terns, when feather hunting was at its height, but due to protection, the birds are once more returning to their old haunts. They nest on many of the offshore islands, and we have found them on Breton Island, Free Mason, and Mitchell Keys, where their two protectively colored eggs are laid in depressions in the shell. They are aggressive little fellows and make ideal photographic subjects, having a pleasing way of alighting near their nests, and approaching with wings raised. The young are hard to find, for they crouch motionless when alarmed, but once the photographer is concealed, they tumble about the uneven terrain, reminding one of thistle down blown by the wind. They nest early in June, and all nests observed June 7, 1930, contained fresh eggs.

FIG. 23. Royal and Cabot's Terns, Chandeleur Islands.

FIG. 24. Royal Terns and young.

Black Tern. *Clidonias nigra surinamensis.* While these birds are common along the Gulf Coast during all seasons of the year, they have not been recorded nesting. They were abundant among the offshore islands and over the coastal marshes during May and June, 1930. We observed them from the western part of the state to the Mississippi border. In Cameron Parish we noted them by the thousands over the lagoons, where they seemed to be feeding upon insects which were destroying the water plants.

Black Skimmer. *Rynchops nigra.* These are common birds of the coast at all seasons of the year. They were numerous at Lost Island, December 8, 1918. Bailey records: "Skimmers are on the islands by thousands—great waves of them. They seem to be more or less nocturnal in their habits; during the day they sit on the mud bars or stalk about, talking with curious, raucous voices, but as soon as twilight comes around, they start flying close over the surface of the water, bands of fifteen to twenty-five working together." They nest abundantly on the islands east of the Mississippi, and colonies will be found upon the ridges of shell thrown up by the waves. The four speckled eggs are deposited in pits which the birds have fashioned with their feet and breasts. The downy youngsters are interesting in that their mandibles are nearly of an equal length, while the lower one of the adult is much longer than the upper. The skimmers were later nesting than the terns during 1930, for we found very few eggs, although the bands of adults were congregated at the chosen nesting sites, and the pits were prepared.

Blue-faced Booby. *Sula cyanops.* A specimen was secured alive in August, 1915, at Avery Island by E. A. McIlhenny; the bird had been blown inland by a gulf storm. Mr. E. S. Hopkins informs me he found a specimen dead on Coral Island, Chandeleur Group, in July, 1929. It was not preserved. Beyer, Allison, and Kopman record several specimens, but it must be considered a rare straggler in the state.

Booby. *Sula leucogastra.* This species is also an accidental visitor. It has been recorded previously, but the only definite record of which we know is an adult in the State Museum at New Orleans, which was collected in April, 1929, on Grand Isle, by E. S. Hopkins.

Anhinga. *Anhinga anhinga.* This is one of the most interesting of the water birds. It is often seen along cypress-lined bayous, and because of its long, reptile appearing neck, it is often called the "snake bird". It nests in cypress trees in company with the herons, and we had many opportunities to study and photograph nesting birds. A dozen pairs had their nests among the low cypresses on Avery

Island, and large young were observed the last week in May. These tawny, downy fellows with long, snake-like necks, are fed by regurgitation, and they thrust their slender heads into the parent's throat in exactly the same manner as do the young pelicans and cormorants. Both sexes incubate the eggs and feed the young. Twenty or more pairs were nesting on Bird Island in Cameron Parish, in the same colony with American Egrets, Florida and Mexican Cormorants, and Wards' Herons. A characteristic posture for an adult to assume is to stand with wings and tail half-spread, and the long, slender neck outthrust. While this species has been recorded as a resident, we have no definite winter records.

Double-crested Cormorant. *Phalacrocorax auritus auritus.* An extremely common bird along the coast during the winter. On Lost Island, December 10, 1918, Bailey recorded thus: "The 'nigger geese' were seen by hundreds. We went ashore on one sandspit after dark, with a flashlight, and the birds allowed us within ten feet of them. Their eyes gleamed in the light, and there was a constant shuffling of feet in the hard sand as the big flock moved in front of us. The nearest birds floundered out of the way, but they did not seem greatly alarmed." Cormorants were seen by thousands at Grand Isle, March 15, 1919.

Florida Cormorant. *Phalacrocorax auritus floridanus.* We have not compared breeding birds from Louisiana with specimens from the north; this is the form which has been given as the breeding bird by Beyer, Allison, and Kopman, and by Arthur, but we have not made comparisons to check their identifications. We found a dozen pairs or more nesting on "Bird Island" in Cameron Parish, the nests being rather bulky structures in high cypress trees. Young were well grown at the time of our visit, June 1.

Mexican Cormorant. *Phalacrocorax vigua mexicanus.* This is not a common bird; a few pairs were observed on the big lake at Avery Island during the breeding seasons of 1916, 1917, 1918, and 1930, but no nests were observed. In Cameron Parish, however, it was recorded at Bird Island during the different nesting seasons. This past season there were perhaps twenty nests with half-grown young. Adults were seen sitting about on topmost branches with half open wings, taking sun baths, a habit similar to that of the anhinga.

White Pelican. *Pelecanus erythrorhynchos.* This species is a resident along the coast, but has not been recorded breeding. A flock of twenty-four was observed at Timbalier Island, June 14, 1918, and another of forty, December 10 of the same year, on Lost Island. A

few birds were seen at Grand Isle, March 15, 1919. Many were seen from time to time over the lakes inland from Chenier au Tigre. The pelicans are good natured fellows, and make fine pets. One of the Conservation Department boats picked up a wing-tipped bird and kept it for several weeks. At first he refused to eat, but finally, when he decided to accept the gifts offered, he took fourteen catfish in succession.

Brown Pelican. *Pelecanus occidentalis.* The Brown Pelican nests on the different islands along the Louisiana Gulf Coast, but the largest colony is found on the "mud lumps" at the mouth of the Mississippi River. These lumps were thrown up by pressure from below, and those most thickly inhabited by pelicans are found off the mouth of Pass a Loutre, where thousands of birds come each year to raise their young. The first eggs are laid about the middle of April, the outermost islands being occupied first, and as the birds increase in numbers and overpopulate the islands, the islands toward shore are gradually used until all have their families of downy white youngsters and awkward parents. The nesting season extends over several months, there being fresh eggs on the innermost lump during the middle of June, while the young first hatched were shifting for themselves. We spent several days in June on this reservation and hardly expected to find young birds, for we had just visited several colonies near the Mississippi coast and found none, all the eggs being fresh. There is a difference of more than six weeks in the nesting time of the different colonies.

The old birds lay three chalk-white eggs in bulky nests on the ground, or among the bushes a few feet from the ground. On Errol Island and on some of the mud lumps which were devoid of vegetation, the nests were merely piles of sticks clumsily heaped together, while on North Island they were well made structures in the "mangroves". The young, when first hatched, resemble little India-rubber balls more than anything else; naked, black little fellows that are extremely sensitive to the sun, and so are constantly sheltered by their parents. In a few days the white down appears, and the rookery is white as a cotton field. As soon as the youngster is able to paddle about, he keeps his parents fishing in order to satisfy his enormous appetite, and there is a continuous arrival of old birds from afar—a long string of birds flying with methodically timed strokes—a few strong beats and then a coast, each bird following the wing strokes of the leader, and all scaling so close to the surface that it seems they must strike the water at every beat. And what excitement there is when the old ones arrive!

FIG. 25. Windrow of terns' eggs, washed up by the waves at Chandeleur Islands.

FIG. 26. Forster's Tern on the nest.

The downy fellows follow after the old ones with anxious, begging cries; the parents open wide their beaks and disgorge the fish, while the youngsters anticipate its arrival by thrusting their heads down the parent's throat. It is amusing to see heavy youngsters, weighing more than the adults, feeding in this manner, and the more they receive, the more they beg. They flop their wobbly wings and jerk their heads back and forth, blinking their eyes and staggering about. Often they receive so many fish that the tails of the last ones remain in sight, and when extra large fish are taken, their course can be followed down the skinny necks. Often the babies become so gorged that they sprawl on their breasts, or flop over on their backs with feet extended in the air. At first, when we walked around the rookery, we thought these stuffed fellows were dying, but when they were straightened out, they immediately disgorged and started paddling away. The young large enough to travel take to the water immediately when one comes near their home, and they gather in large flocks as they drift idly in the quiet water and wait until their rookery is undisturbed.

The pelican secures his food by diving, but only fish living near the surface are caught. Of the many we examined, not one game fish was found. Menhaden, a bony sardine, and a few mullet make up the bulk of their food supply during the breeding season.

Bailey records that at Grand Gosier in June, 1918, "we counted over 1200 newly made pelican nests with fresh eggs in each. We visited this island six weeks later, and expected to find it overrun with fuzzy youngsters, but to our surprise, there were fewer than 200 nests, and only one or two young in each nest. We thought at first that the abnormally high tides had drowned them, but we discovered four nests of sea turtles which had been robbed, and there were many tracks of raccoons. Undoubtedly, these animals cause immense damage among the nesting sea birds."

MAN-O'-WAR-BIRD. *Fregata aquila.* This species, which is known as the "storm bird" by the people of the coast region, is a summer visitor. We have never seen it during the winter. They are abundant about the pelican colonies on Errol and North Islands where they secure an easy living stealing from the nesting birds. It is a common sight to see thousands of these long-winged marauders sitting about the bushes; as one approaches the colony the Man-o'-war-birds take wing and sail directly overhead, often poising on outstretched wing as they eye the intruder inquisitively; often they will circle high in the air until they appear as small dots in the sky. A few definite records of their occurrence may be given; namely, several hundred were seen

at Isle of Pitre, June 7, 1918, and others on the same date at North Island. They were only about one hundred at Errol Island, June 5, 1919, while on June 10, 1930, several thousand were noted in one flock at North Island. Beyer, Allison, and Kopman give the species as a resident and breeding commonly, but on our many trips to the bird islands we have no evidence to support this.

Red-breasted Merganser. *Mergus serrator.* This is a common bird of the coast during the winter months. The local name, "bec-scie de mer" (saw bill of the sea) is an appropriate one, for they are found along the passes and in the gulf. They were seen on practically every trip during the fall and winter months, and Bailey's notes record that specimens were taken in Vermilion Bay, November 20, 1916, at Grand Island, March 15, 1919, and that there were many at the mouth of the Mississippi River off Main Pass, October 25, 1928. He failed to identify *Mergus americanus*, although it undoubtedly occurs along the coast in winter.

Hooded Merganser. *Lophodytes cucullatus.* These handsome birds were seen in small flocks in the tidal streams and bays along the coast during the winter. In November, 1918, many were observed in the small bayous adjacent to Vermilion Bay, and a few specimens collected. Several flocks were noted at Chenier au Tigre, March 10, 1918, and one bird in the same locality, December 8, 1925. While this species is generally distributed, it is never seen commonly when compared in numbers with other species of ducks.

Mallard. *Anas platyrhynchos.* This is the common duck of Louisiana. They begin to arrive the latter part of October, and many remain until the latter part of April. They were observed in pairs in the western part of the state, in April, just before they started their northward migration. Their distribution is general, and their abundance in a given region from year to year, depends upon the food supply. In November, 1916, they were particularly numerous near Chenier au Tigre. A trapper told us that in a single run of ninety muskrat traps, he had caught seventeen Mallards. Under date of November 17, Bailey's notes read: "I never can hope to see more Mallards than I saw when I cut across from the ridge, for they rose in clouds from almost under foot, only to settle down a little way ahead. In places, they would rise from the cane, and would get tangled so that one could easily catch them."

Black Duck. *Anas rubripes.* This species is generally distributed along the coast, and a few were seen on practically every trip during the winter months. They were noted as common on just one occasion,

near the Pass a Loutre, at the mouth of the Mississippi River, early in November, 1918, and even then they were few in comparison with the number of Mallards.

Mottled Duck. *Anas fulvigula maculosa.* We have eight specimens of the "summer Mallard", including five from the eastern part of the state, two from the western, and a breeding female from the central part, (Chenier au Tigre). They vary considerably in the markings and the head, the breeding bird being especially lightly streaked. This specimen, which was taken with a set of eggs, May 27, 1930, appears faded, and the dark mottlings of the breast feathers are distinctly brownish in contrast with the black markings of the other seven birds which were collected in November. The mottled duck is a common resident of the salt marshes, and they nest abundantly during April and May. The bird upon the nest will often allow one within a few feet before flushing from the eggs, and when young are near, it will flop upon the marsh grass in an attempt to decoy the intruder away. The nests are concealed in grass, and are lined with down plucked from the breast. Bailey encountered an old bird with a brood of young at Chenier au Tigre, May 5, 1917, another one May 12, 1918, and found a nest containing twelve eggs, April 6, 1919. Three sets were found March 9-13, 1931, which varied from eight to eleven eggs. Owing to the fact that the nests are built on the ground, many are flooded when the gulf is forced back into the marshes.

Gadwall. *Chaulelasmus streperus.* This is a common form in Louisiana during the winter months. They begin to arrive early in the fall; they were common at the mouth of Main Pass by October 24, (1928), and were extremely abundant in western Louisiana on November 1. These birds were not regarded highly by the market shooters, as they spoil quickly. We have not encountered the species during the summer months.

Baldpate. *Mareca americana.* This beautiful duck is also a common form during winter, and occurs in mixed flocks with the preceding species. They arrive early in October and many linger until early in the spring. We have no records of their occurrence during the summer months.

Green-winged Teal. *Nettion carolinense.* A common species during the winter months. They arrive early in the fall with many other forms, and on October 24, 1928, they were abundant in the marshes adjacent to Main Pass at the mouth of the Mississippi River. They are generally distributed throughout the marsh country, and often are found in large flocks.

FIG. 27. Nest and eggs of the Least Tern, on the shell beach.

FIG. 28. Coots, at Chenier au Tigre.

Blue-winged Teal. *Querquedula discors.* The blue-wings arrive early in the fall, and many of them migrate to northern South America. They are common throughout the lowlands during winter, and are the last of the ducks to leave for the north in the spring, many of them lingering along the gulf until the first part of May. We have no records of the species breeding in the state. They are tame, and are often found in large flocks feeding about the borders of lagoons. On October 24, 1928, Bailey recorded them as common at the mouth of Main Pass, and on one occasion, observed a flock feeding in company with Coots and Shoveller ducks, while along the mud flats were several beautiful American Egrets.

Shoveller. *Spatula clypeata.* The Shovellers are common in lower Louisiana from the latter part of October until April, and a few linger in the marshes even during the summer months. They were especially abundant in Cameron Parish, November 1, 1928. A pair was observed May 27, 1930, at Chenier au Tigre.

Pintail. *Dafila acuta tzitzihoa.* Pintails are common winter residents, the first arriving in late October, and the last stragglers returning to their northern breeding grounds in April. Often, several hundred males will be seen in a single flock; they are favorites of the sportsmen, and thousands are killed during the hunting season.

Wood Duck. *Aix sponsa.* This species inhabits wooded regions and is an uncommon one along the coastal marshes. The only record from the salt marshes which we have is one, a female, at Chenier au Tigre, December 15, 1925. They are not uncommon, however, along the wooded bayous near Avery Island, and a few pairs nest on the large lake in the center of the Island. We saw a small flock among the reeds May 18, 1930, and on the same date, encountered a female with a band of five half grown youngsters. Mr. McIlhenny reported them as fairly numerous along the wooded bayous.

Redhead. *Marila americana.* The only definite records we have of this species are a few specimens taken at Belle Isle Lake, Vermilion Parish, in December, 1925. They prefer the waters along the coast and large open bays, and Mr. McIlhenny reports them as numerous at certain times.

Canvas-back. *Marila valisineria.* This species is found along the coast or upon large lakes, as are the Redheads, but is more abundant. Bailey found it common at the mouth of the Mississippi River early in November, 1918, and a few were seen in the vicinity of West Chenier Lakes, Chenier au Tigre, in November, 1916, March 6, 1918, and in December, 1925.

Lesser Scaup Duck. *Marila affinis.* These birds are very common in the larger lakes and estuaries, sometimes occurring in great numbers; they begin to arrive early in October, and many linger until the middle of April. In fact, Wright collected a specimen on Avery Island, May 17, 1930, which had been banded by Mr. McIlhenny at the same locality, February 12, 1930. The scaups are typical bay ducks, and are found most abundantly where the bays are affected by the tide. Although many scaup ducks have been examined, we have failed to find a single one which could be referred to *Marila marila.* The latter undoubtedly occurs, however; Beyer, Allison, and Kopman state it is a bird of the open gulf.

Old-squaw. *Clangula hyemalis.* This rare straggler has been recorded a few times from Louisiana, and Mr. E. S. Hopkins has given us data for three other specimens. He killed a female at Grand Isle, April 4, 1921, and another in Cameron Parish, January 22, 1929, and saw a male which was shot by a sportsman, at the Delta Duck Club, in December, 1928.

White-winged Scoter. *Melanitta deglandi.* This species is listed by Beyer, Allison, and Kopman, and by Arthur, but the only definite record we know of is a young male taken in Cameron Parish by Elmer Bowman, the latter part of December, 1924. This specimen is now in the office of Mr. Lutcher Stark, at Orange, Texas, and it was recorded in the *Auk*, July, 1925.

Ruddy Duck. *Erismatura jamaicensis.* A very common winter resident, but we have not recorded it in large numbers, in any one locality. They are found in the lakes of the marshes, and when alarmed, often seek to escape by diving rather than by taking wing. They are generally distributed over the low country. A few were observed October 24, 1928, at Main Pass, and others were seen in Cameron Parish, November 1. They are not held in high esteem as game birds, as one of their local names "god-dam", will bear witness. This expletive is used when the hunter attempts to pick his duck, for they are very tough skinned.

Snow Goose. *Chen hyperboreus hyperboreus.* This species winters along the entire coast of Louisiana, but they are found most abundantly in the western part of the state. They arrive the latter part of October, and leave for the north in April; their range is restricted to within a few miles of the coast. There is a great tract of land in Cameron Parish along the Sabine River and bordering the gulf, the property of Mr. Lutcher Stark, where Snow Geese were extremely

abundant during November, 1928. The territory is a natural wintering ground, and I am told that the birds occur abundantly each season. The great flocks were feeding on the tender shoots of grass, and at times, it appeared there were acres of snow white birds. The dark colored young were numerous, (in fact, the big flocks appeared to be formed of family groups), but they were so protectively colored that they were not conspicuous, as were the adults. Among these flocks were a few Blue Geese—possibly one Blue Goose to twenty Snow Geese. In the eastern part of the state, the ratio is reversed; the Blue Goose is the common bird, and the white one the interloper. Of many Snow Geese examined during several seasons, not one approached the size given for the Greater Snow Goose.

Blue Goose. *Chen caerulescens.* This is one of the most interesting of the game birds found in Louisiana. It is extremely abundant locally along the coast, from the mouth of the Mississippi to the central part of the state, in the vicinity of Chenier au Tigre. Farther west the species is found associated with the large flocks of Snow Geese. They arrive on their wintering grounds early in October, and remain until April. The main migration occurred, in the fall of 1928, on October 25, and Bailey records their arrival at Main Pass, at the mouth of the Mississippi River—"we went down Piling Bayou and into our blind along the gulf about nine o'clock. The noise of the boat flushed about 2,000 Blue Geese from the marsh, which we were sure were new arrivals. We soon realized that the main migration of the Blue Geese was on, for flock after flock and calling horde after horde came in from the west. They were flying high and each flock was apparently following in calling distance of the one before. The flight continued all the time we were in the blind, from 9:00 in the morning until 4:30 in the afternoon, with a flock of from fifty to two hundred birds in sight at all times, and often there were several flocks. We heard the birds coming in all night. A strong northwest wind had been blowing, which shifted to the northeast."

Chenier au Tigre is another ideal place to study the Blue Geese. They feed and spend the night in a great flat area known locally as the "pasture". Every morning the geese rise from their resting place and wing across the marshes, often stopping to feed at the Paul Rainey Reserve, or continuing on to the gravel banks of Hell Hole Beach. It is a wonderful sight to see the geese returning in the evening. On March 10, 1918, Bailey's field notes read, in part, "we saw the Blue Geese coming into the pasture, and it took them a full thirty minutes to pass—just a continuous stream. They seemed to fly in several dis-

FIG. 29. Young pelicans, on mud lumps, Chandeleur Islands.

FIG. 30. Pelicans, on mud lumps, Chandeleur Islands.

tinct groups, with about seventy large flocks to the group. There were five of these hosts of geese in all, and the regular V-shaped formations were often so interlaced that intricate networks were traced in the sky."

The plumage of the Blue Goose is varied, the belly often being nearly white, and we have specimens with white in the wings and back. Hybridism between this species and the Snow Goose is probable, for the forms are closely associated, and oftentimes an adult Blue and an adult Snow Goose will be seen with a small group of young birds, which would appear to be a family group. Bailey has observed such groups, and on October 25, 1928, one such family, if a family it was, passed his blind three times. This little band of five birds passed directly overhead, a fine Snow Goose leading, three gray immature birds following, and an adult Blue Goose with dark belly bringing up the rear. The guide called his attention to this one band, particularly. A half hour later they were seen again, in the same order, as they "bucked the current of the migration", winging northwest. They flew out of sight, and then, a few moments later, they were again seen drifting back with new arrivals. They were flying in the same group formation, with the Snow Goose leading.

There are approximately thirty Snow and Blue Geese in Lincoln Park, in Chicago, and we have watched them in the spring with interest. They pair off indiscriminately, and it is more unusual for a Blue Goose to have a similarly colored mate than it is for it to be paired with a Snow Goose.

White-fronted Goose. *Anser albifrons albifrons.* This small race is the common one—if there are two forms in North America. It is found most commonly in the western part of the state where it feeds on the drier portion of the marsh. They were abundant in Cameron Parish early in November, 1917, and were observed again in November, 1928. Two were collected at Chenier au Tigre, April 6, 1919. They are rare along that part of the coast.

Tule Goose. *Anser albifrons gambelli.* During the fall of 1923, three specimens were secured, two at Pilot Town at the mouth of the Mississippi River, and the other in Cameron Parish in western Louisiana, which approach the size given for the Tule Goose. In some measurements they greatly exceed the minimum for that form, and in others they are slightly under. In other words, they are "betwixt and between" specimens. We are slightly skeptical about the advisability of two races for this species, when there is no geographic ground as a basis. When Messrs. Swarth and Bryant published the results of their study (1917), the difference given for *gambelli* included (1)

greater size, (2) difference in color of eyelid, (3) difference in number of tail feathers, and (4) difference in general coloration. It has been shown that the color of the eyelids and the number of tail feathers can not be used as diagnostic characters, and we doubt that the coloration of the back is any better. If the underparts of the White-fronted Goose are variable and become darker with age, then the upper parts are just as likely to be subject to change. The main difference between the two races, then, is one of size, and there seems to be a continuous gradation from the smallest to the largest. If the breeding grounds of the large bird could be found, and a geographic range established, we should feel that there is a more legitimate reason for dividing the White-fronted Geese into two races. The measurements for our three Louisiana birds, which are intermediate, but nearer those given for *gambelli* than *albifrons*, are: (C. A. of S. No. 2007) male, culmen, 55 mm.; wing, 430 mm.; tarsus, 72 mm. (C. A. of S. No. 2001) female, culmen, 57 mm.; wing, 415 mm.; tarsus, 70 mm. (C. A. of S. No. 1977) immature, culmen, 50 mm.; tarsus, 71 mm.; wing, 405 mm. Numbers 2007 and 1977 were taken at Pilot Town, Louisiana, and the immature specimen was a soft-bodied bird. It weighed 5½ pounds. The adult female, Number 2001, a very dark-bellied bird, was taken in Cameron Parish.

Canada Goose. *Branta canadensis canadensis.* This species is fairly common locally in Louisiana during the winter months. It has become scarcer of late years, however. It arrives early in October, the first birds making their appearance at the mouth of the Mississippi in 1928, before the middle of the month. About one hundred birds were seen feeding in the marsh in company with an equal number of White-fronted Geese. This species was recorded from Chenier au Tigre but once in the many visits to that place, a half dozen birds on April 6, 1919. A fine flock of 150 birds was observed on the State Wild Life Preserve in November, 1916. The warden, Wilfred Trahan, said the flock had grown from 15 birds to 150 during the three years he had protected them. Cameron Parish is an ideal location to study these birds, for they still occur in numbers in certain places. They were common in the rice fields during February, 1919.

Branta canadensis subsp. Two small geese were collected by Bailey at Cameron Farm, Cameron Parish, February 27, 1919, the only ones observed in three years of field work. We never satisfactorily identified the birds, for some of their measurements placed them as *minima*, while others approached those given for *hutchinsi*. The Hutchins's Goose has been recorded as common in winter, and it may

have been in years past. It certainly is far from being numerous at the present time.

Fulvous Tree Duck. *Dendrocygna bicolor.* The first of this species was observed at Chenier au Tigre, May 6, 1917, a flock of twenty-five over the marsh. Five specimens were taken. A few small bands were seen during the following week. The birds have a characteristic flight, their long necks and dangling legs, and their methodical wing strokes giving them the appearance of ibises. A few were seen the following spring, but during the winter of 1925 the "Mexican squealer", as he is commonly known, was abundant in the vicinity of the Chenier. The marsh men told Bailey that about two thousand had ranged near the entire fall. There were about five hundred birds during his visit in December.

Roseate Spoonbill. *Ajaia ajaia.* This is an uncommon species, its distribution being limited to the western part of the state, for the most part. A few were seen occasionally at Avery Island during the summer months; two were observed on April 27, 1917. A nesting colony was formerly located in the cypresses of Black Bayou, near the Sabine River. Fourteen birds were observed June 16, 1919, but they were not nesting. The Black Bayou colony was broken up because of the discovery of oil; greasy derricks and rattling machinery now are found where the roseates once held forth. The only nesting colony in Cameron Parish, so far as we know, is in a little cluster of cypresses known as Bird Island. The roseates are irregular in their nesting habits, however, and do not return to the Island every year. During the summer of 1930, we did not see a single roseate in the bird colony. The people living near by reported a few in flight the week previous to our visit, and we saw five birds over the marsh on the Cameron Land Company holdings. A small band was observed November 1, 1928, in the general locality.

White Ibis. *Guara alba.* This form has been given as a fairly numerous one, but our experience does not justify this view. A few were seen at Avery Island, April 27, 1917, and one was collected, and a few were observed in Cameron Parish, June 16, 1919. Bailey and S. C. Arthur wore out a great deal of shoe leather in various marshes, endeavoring to find nesting places, where the birds were said to be "by thousands". Small herons were seen, but not a White Ibis. They undoubtedly nest in limited numbers, however, but they are far from abundant.

FIG. 31. Snowy Egret on nest, Avery Island.

FIG. 32. Little Blue Heron on nest, Avery Island.

Glossy Ibis. *Plegadis autumnalis.* The only records we have are from the mouth of the Mississippi River. There are four specimens in the Chicago Academy collections, secured through the kindness of Messrs. E. R. Pike and Joseph Leiter, which are of this species. Bailey saw several flocks in the same locality, October 22, 1928, and they were probably this species, but no specimens were taken.

White-faced Ibis. *Plegadis guarauna.* Ibises are usually common in the marshes of Vermilion Parish during the winter months, and flocks of hundreds of individuals are not unusual. All the specimens collected proved to be this form, although it is probable that some of the birds observed were of the preceding species. A few specific occurrences are as follows: ten were observed in the State Wild Life Sanctuary, November 20, 1916; several hundred at Chenier au Tigre four days later; common in large flocks, May 5, 1917, and again January 15 to 21, 1919. On January 15 Mrs. Bailey recorded in her notes, "the ibis has a swift, erratic flight when cruising over the lowlands; it swirls about in the air with wavelike motion so characteristic of skimmers, swooping this way and that, its wings making a loud, swishing noise in turning—a noise which is audible for several hundred yards. Each bird flies with no particular position in the flock, seemingly, but the flock rises and falls together with a rapidity which is surprising. When alarmed, however, they have a direct flight, the whole flock stringing out in file, each bird holding its relative position. They are curious, and occasionally the flocks will circle overhead, sailing slowly along and peering down with little calls of alarm. When the ibises alight and are feeding, they talk to each other contentedly, a noise which resembles the voices of a crowd of people talking at a distance; they feed in the long marsh grass where they catch crabs and crayfish."

Wood Ibis. *Mycteria americana.* This species makes an irregular appearance in the lowlands; it will be seen commonly during the summer months in a given region, and few will be seen the following season. It was common in the marshes along the Sabine River, where it fed in company with the Roseate Spoonbills, in June, 1919, but during 1930, we did not see a single bird. Several large flocks were observed November 1, 1928, near the Gulf Coast, in Cameron Parish. It nests, as formerly, within the state; small colonies are reported from Tammany and Madison Parishes, by Beyer, Allison, and Kopman.

[To be continued]

THE WILSON BULLETIN

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EDITORIAL

As we prepare this issue of the BULLETIN we learn that the St. Louis Bird Club is planning to celebrate the ninetieth birthday of Mr. Otto Widmann, which occurs on June 15th. Many of our readers may recall the delightfully written autobiography of Mr. Widmann which was published in the WILSON BULLETIN for September, 1927. In behalf of the Wilson Ornithological Club we offer our congratulations to Mr. Widmann.

PROFESSOR GORDON WILSON, a former secretary of our organization, has published a synopsis of his doctor's thesis, which has Alexander Wilson for the subject. Professor Wilson displays a sympathetic appreciation of Wilson's many-sided nature, and the brief abstract indicates a thorough study of the life of his subject. While Alexander Wilson is given full credit for his scientific work, he is regarded "primarily as a poet, essayist, and letter-writer, and as such, he is one of the greatest interpreters of America." Perhaps a literary student would be prone to magnify the literary qualities of the man, just as the scientist will understand and appreciate best his scientific work. And the artist may emphasize his artistic power. We hope to be able to present in the BULLETIN some contribution by Professor Wilson on Alexander Wilson.

INVESTIGATION of the "duck sickness" in Utah and elsewhere is still in progress. Formerly this malady of ducks was supposed to be due to excessive alkali in the water, resulting, perhaps, from drainage, dry seasons, and evaporation. More recently Kalmbach (*Science*, LXXII, Dec. 26, 1930) reports experiments which indicate that the symptoms of the duck sickness may be produced in healthy birds by feeding to them the tissues of the sick birds; and the disease may be passed on to a second, or third, bird by the same method. The feeding of natural and synthetic alkalis has not produced comparable results. Later, Giltner and Couch (*op. cit.*, p. 660) isolated and identified *Clostridium botulinum*, type C, (same as *Bacillus botulinus*) from the mud in an infected area in Tule Lake, California. This is the bacillus which causes the disease known as Botulism. A recent editorial in the *Journal of the American Medical Association* (March 14, 1931, p. 864) gives a critical review of the facts and concludes that "it must be shown that the preformed toxin and not merely the bacillus was present in the suspected food or the tissues of the diseased animals."

Science, for May 22, 1931, (Vol. 73, No. 1899, p. 12) gives a very brief report of the recent meeting of the American Society of Mammalogists. It appears that the poisoning campaign of the U. S. Biological Survey was again strongly condemned, charges being made that the Survey is playing into the hands of the livestock industry and that it has distributed poison to livestock men. It was also reported that the Survey men defended themselves by asserting that the quantity of poison used has been reduced from 13,000 ounces in 1930, to 10,000 ounces in 1931, with a proposed reduction to 8,000 ounces in 1932, a total of 31,000 ounces of poison used in three years on the wild life of the country. Who will say that this is not wholesale destruction? Folks are beginning to wonder if the Survey does not need re-christening, and certainly a reorganization would be welcome.

During the spring of 1931 a printed circular entitled "Facts About Hawks" was distributed by Jack Miner. It would be too difficult to abstract this circular with full justice to the author; suffice it to say that Mr. Miner is not only opposed to the protection of hawks, but he favors the destruction of most kinds of hawks. At the close of the circular the author gives a report of the stomach analyses of about sixty-five birds of prey.

A month later, April 7, 1931, there was issued from Toronto a four-page leaflet entitled "The Brodie Club Examines Jack Miner's 'Facts About Hawks'." This is a careful analysis of the arguments and logic of Mr. Miner's circular, and, though judicial, is much more favorable to the hawks. It seems to us that all such controversial matter should be signed by the author or authors. This letter is quite proper and wholesome, and does not deserve the stigma of anonymity.

It is beyond our scope ordinarily to comment on the major ornithological journals. However, the last issue of the *Ibis* for 1930 merits special mention. In addition to the regular full sized number for October there appeared two supplementary numbers entitled a "Review of the Genus Cisticola", by Rear-Admiral H. Lynes. The text covers 673 pages, while the twenty colored plates are bound together to form another supplement. Such a voluminous monograph is seldom published by a periodical, but in this case was furnished to subscribers and members gratis. This publication formed a fitting finale to the editorial regime of Mr. William Lutley Sclater.

GENERAL NOTES

Conducted by M. H. Swenk

Nesting of Bachman's Sparrow in Butler County, Ohio.—On a field trip taken on August 6, 1929, a small bird was flushed from a hillside covered with blackberry bushes and short grasses. On investigating, I found a nest of Bachman's Sparrow (*Peucaea aestivalis bachmani*). The nest was partially sunk in the hillside. The bottom of the nest was almost bare, but the sides and top were very compact and well built, with a slight arch over the entrance. The nesting material was composed of grass and small weed stems. The nest contained four eggs, pure white in color, with incubation well advanced. From all reports available, this is the only record of the nesting of this species in this county.—C. K. Lloyd, *Oxford, Ohio.*

Bald Eagle Captured in a Trap Set for a Hawk.—About the middle of December, 1930, a farmer living near Wheeling, West Virginia, set a steel trap by a partly-eaten chicken which he supposed had been killed by a hawk. On the following day he found a Bald Eagle (*Haliaeetus leucocephalus leucocephalus*) in the trap. Thinking the bird would make an interesting pet he confined it for a couple of weeks in a latticed-in enclosure under a porch. After the eagle had worn out the feathers of its wings and tail by beating against the walls of its prison, the farmer reported his catch to Oglebay Park. An effort was made to save the eagle's life, but it died soon after being released.—A. B. Brooks, *Wheeling, W. Va.*

Aggressive Behavior of Screech Owls.—In July, 1927, my attention was called to the behavior of a Screech Owl (*Otus asio asio*) that had nested in a bird box placed in the garden of a suburban home near by. The small daughter had gone into the garden on an errand about dark. The Screech Owl flew at her, flapping its wings and cracking its bill. Hearing the commotion an older child went to the rescue, when the attack was transferred to the newcomer. These attacks were kept up as long as any one entered the garden about dusk, but no one was molested during the day. I believe that these attacks were made in defense of the young.

A farmer reports that on going to and from his work, he had to pass through a strip of woods at dusk. A Screech Owl would fly at him, cracking its bill. This took place nearly every evening. It did not show its displeasure in any other way.—Katie M. Roads, *Hillsboro, Ohio.*

Trematodes Infesting the Neck of a Great Blue Heron.—In September, 1930, a Great Blue Heron (*Ardea herodias herodias*) that had been shot was brought to me for mounting. While skinning the bird I found six live parasites on the flesh of the neck under the skin, about three inches below the head. I removed the flukes and preserved them. They were later identified by Dr. Bennitt of the University of Missouri and Dr. H. W. Stunkard of the University of New York as *Clinostomum attenuatum.*—Cora E. Shoop, *Mascoutah, Illinois.*

Little Blue Herons and Egrets Near Toledo, Ohio.—Prior to the year 1930, the only record of white herons in Lucas County was a group of eight immature Little Blue Herons (*Florida caerulea caerulea*) observed by Mr. Louis Klewer in September, 1925, in the Maumee River Rapids south of Waterville,

Ohio. On April 19, 1930, I found an adult Little Blue Heron in the marshes near Bono, Ohio. Then came the historic drought driving the wandering herons far from their usual haunts. The first Egret (*Casmerodius albus egretta*) was seen on July 20 near Bono accompanied by fifteen Little Blue Herons in the immature plumage. Day by day their numbers were increased, and on the week end of August 9 and 10 an attempt was made to count all of the white herons in Lucas County. On August 9, Professor E. L. Moseley and the writer visited the rapids of the Maumee River between Maumee and Grand Rapids, Ohio. The following morning, August 10, the writer alone covered the marshes around Bono, Ohio. The final count was: Little Blue Herons, August 9 (60); August 10 (25), all in white plumage; total 85. Egrets, August 9 (21); August 10 (25); total 46. From this date their numbers became smaller. My last record for the Little Blue Herons was four on August 24; for the Egrets, four on September 20.—Louis W. Campbell, *Toledo, Ohio.*

May the Color Pattern of the Mockingbird's Wings Aid in Finding Insect Food?—I have often admired the pretty way in which the Mockingbirds (*Mimus polyglottos polyglottos*) raise and extend their wings at intervals while tripping along the grassy sward of lawns or pastures, but had always considered this as merely a display of vanity. However while watching a pair of Mockingbirds at Pensacola, Florida, in the spring of 1928, I was shown that this display may have a very practical use. These birds had a nest of young in a honeysuckle vine on a gate post and they frequently carried on the search for insects in a nearby field. As I watched I was impressed with the frequency with which the wings were opened and closed. Also, I noted that while the dull gray Mockingbird blended well with the background of earth and grass, yet when the wings were extended he became very conspicuous. The idea occurred to me that to an insect on the ground this sudden spreading of the contrastingly colored wings must be actually startling. With this in mind I watched with greater care and on several occasions noted that grasshoppers or similar insects flew from the grass as the bird made this display and that it quickly pursued them. After considerable observation I was convinced that in this instance, at least, the Mockingbird's striking wing pattern was of real assistance to it in finding insect food.—Frank F. Gander, *Natural History Museum, San Diego, Cal.*

Food Regurgitation by Young Kingbirds.—In the summer of 1928 I found a nest of the Kingbird (*Tyrannus tyrannus*) on some timbers hanging from some roof-trusses on which the wood sheathing had not yet been placed. I could watch the nest from a point above and fifteen or twenty feet distant. I noted some very interesting things in regard to the family life of the Kingbird, but the most interesting was the fact that the young, after being fed, would often, but not always, regurgitate a pellet of undigested matter and that the parent bird would watch carefully for this pellet and when it appeared would take and swallow it.

An ornithologist to whom I mentioned this said that perhaps I had seen the adult bird take and swallow a parcel of excrement, as is often done. However, I am sure that this was not the case as the pellet was always taken from the young bird's mouth. I saw it very distinctly a number of times and I was in an unusually advantageous position to make the observation.

I have not been able to find any reference to this habit in bird literature, but Thomas Nuttall, on page 267 in Vol. 1 of his "Manual of the Ornithology of the United States and Canada" (1832) states that the adult Kingbird regurgitates the indigestible portions of the insects it has eaten. I would like to know if others have observed regurgitation by young Kingbirds and the swallowing of the pellets by the parents.—C. S. BAUMAN, *St. Louis, Mo.*

Erratic Movements of the Red-headed Woodpecker.—The Red-headed Woodpecker (*Melanerpes erythrocephalus*) is a fairly common bird, in the summer time, in and about Sigourney and Keokuk County, Iowa, where it may usually be seen most anywhere—by the roadside, on telephone poles, on fences, or in the deep forests—but is rare in the winter time. It is as a rule most common and conspicuous during September, October, and November. However, in September of 1929 it completely disappeared from this vicinity. A trip of about sixty miles to Iowa City and back, during the latter part of the month, revealed only a single individual, which was clinging to a telephone pole as we passed.

Although I traveled considerably on the public roads and in the woods and fields, and was always on the alert looking for birds of any species, I did not see a Red-head until April 30, 1930, when I saw one. This was late for the spring arrival of the species, as the migrants usually begin to appear during the latter part of March or the first part of April. In a few days, however, they were here again in their normal numbers. Mr. J. B. Slate informed me that two of these birds had passed the winter in an oak grove near South English. These were the only ones I learned of as being in this county during a period of about eight months.

During the fall of 1930 they remained here, in their usual numbers, and during the winter of 1930-31 they are present in more than their normal numbers. Aside from the fact that this winter, up to the latter part of January, has not been so cold as winters here usually are, the weather and food supply, for the period of time covered by this report, have been, as far as I am aware, about normal.—E. D. NAUMAN, *Sigourney, Iowa.*

Pugnacious Dispositions of Blue Jays in the Defense of Their Young.—As bird lovers know, the Blue Jay (*Cyanocitta cristata cristata*) ordinarily is shy in the presence of man; but this summer (1930) I observed a very pugnacious disposition on their part when defending their young.

On July 20, while going through a pasture adjoining our farm, I noticed two objects clinging to the base of the trunk of a large beech, and, as I had not noticed such objects on this tree before, I investigated and found that they were young Blue Jays that had but recently left the nest, since they could not fly very well. They did not move until I picked them up, when they began to call for help as loudly as they could. Until then there had been no adult jays in sight, but the minute the young started calling, both parents were in the trees above my head, screaming with all their might and flying about from tree to tree. The young then stopped their calling and sat on my fingers, as tame as a couple of little chicks.

But the adult jays became furious, and came darting at my head from the nearby trees, finally actually striking me on the top of the head. They took turns flying at me and striking me, and continued this for some time, screaming all the while. Then one young bird jumped from my fingers to the ground, and

went hopping and fluttering along. One of the adults flew to its side and fluttered about, then flew back at my head, while the other adult continued to dart at me. The other young bird then flew away also. I caught both of the young and placed them on a branch of a beech. But as I walked away the adult birds still waged war upon me.—RAYMOND O. MARSHALL, *Leetonia, Ohio.*

Some Accommodating Bird Tenants.—The elements of weather had hollowed out the center of an old fence post. This opening afforded a Bluebird the desired protection for a home in which to rear her family. Early in May she located this spot, and had built a nest at the bottom of a vertical hole that descended for about a dozen inches. There she brooded over her complement of four pale, greenish-blue eggs. The eggs hatched and the youngsters developed rapidly, as the mother did more than her share in bringing food for her babies. This continued for a couple of weeks, then one morning the home was deserted.

Scarcely a fortnight after the Bluebird family had departed, a pair of wrens decided that the same fence post would suit them for a summer home. It was necessary to make a few improvements, so the pair brought in quantities of sticks and twigs and soon the bottom of the hollow cavity was filled with sparse material. The door that had been cut in the side of the post by the writer admitted too much light, and this was closed with a bunch of sticks. Some soft material lined the interior of the nest and there a Bluebird's feather, left by the previous tenant, could be seen. While watching the scene of this happy home one afternoon, the last of the family clambered to the top of the post. There he sat for a time but a passing wagon frightened him and he dropped into the tall grass. In a few minutes he escaped from view and the home in the old post was again vacant.

A few years later another pair of wrens chose a more conspicuous place in which to build. They gathered sticks and a small amount of feathers and down, which they fashioned into a nest of the usual type placing it in the transom of a doorway in a busy section of a little town; a rather unusual place for wrens to start housekeeping. They reared their family and seemed little concerned about their proximity to man's dwelling. Their nervous chattering, during the brief time they occupied the transom home, lent a pleasing note to the long day. They slipped away one day before we hardly knew they were gone. Later during the same summer a Robin saddled her nest upon the top of the wren's nest, probably thinking that it was no more than a convenient foundation for her home. After a period of careful attention, during which the mother braved her conspicuous position above the door, the young developed until the nest was running over with flesh and feathers. The nest was no longer large enough to hold them and they were forced to leave their home.

While Robins, Bluebirds, and wrens often return to their former nesting places, we wonder whether such tenants would accommodate each other again as they had done in "The Old Post Home" and in "The Transom Home."—S. W. FROST, *Arendtsville, Pa.*

A Land Migration of Coots.—One of the most interesting sights in bird migration which I have ever seen, occurred in the Warner Valley region of Lake County, Oregon, in May of 1929. This area is an immense marsh and lake region, some thirty-six miles long and from five to seven miles wide. Large and

small lakes, ponds, and water almost everywhere, and large areas of tules and flags, with wild grass lands.

I was located at the southern end of the valley, and on my arrival was informed that thousands of large black-colored birds were passing through the marshes northward. So on the next morning, May 9, I went to the location mentioned, which was about two miles out in the marsh and there in full view some 300 yards distant were the Coots (*Fulica americana*) marching northward like an immense army, from six to twenty-five of them abreast. They followed the course of dry land wherever possible, and did not enter the water to swim across ponds and lakes, but followed the shore lines, in constant motion. They did not seem to be feeding. They would not rise to wing unless approached too close, and then would fly only a short distance, and continue their northward course.

The season of 1929 was a very late one. Generally at this time nests with full complements of eggs could be found. But in 1929 at this time they had just arrived from the south. The open ground where these birds could be seen extended about one-half of a mile in length, and the birds covered the entire length. I judge that not less than 5,000 birds passed this point the first morning of my visit.

Again the next morning I visited the place, and the procession was still in progress, with 3000 birds in sight. Again on the third morning of my visit the Coots were still walking northward, but in very much reduced numbers, now scattered in flocks of fifty to one hundred birds. The fourth morning the migration had been completed at this point. My estimate of 10,000 birds seen during the four-day observation I believe is far below the actual number.

Visiting the northern part of the marshes a few days later, I found the birds scattered in all directions, looking for their summer nesting locations. Not until about June 1 were any nests found, with eggs, and these with incomplete sets. The marshes and tules, however, were filled with new nests, and Coots were everywhere.

How many of these Coots remained for the season in Warner Valley, I am unable to say, but there was an abundance of room and food. In talking with the older resident of the valley, and some who live out on islands in the marshes, I found no one who had ever seen this before. My record set of Coot's eggs is seventeen, taken in 1925.—Dr. A. G. Prill, *Scio, Ore.*

Five Little Migrant Shrikes.—On May 25, 1927, five fluffy Migrant Shrike babies, with tails about an inch long, were sitting in two elm trees beside Snail Brook, west of Norman, Oklahoma. They were vociferous, and demonstrative with their wings, whenever their parents came to them, but quiet in between meals. The begging note was a harsh *ker ker ker ker.* Once when a parent left, the young said *too too;* when I came near, they remarked *krou krou krou;* sometimes they grunted as they sat waiting. They also preened themselves and pecked at leaves.

Interestingly enough, mother *Lanius ludovicianus migrans* went to an old nest forty feet up in a nearby elm, and from there flew with a twig to a new nest about a hundred feet to the north. This new nest was thirty feet from the ground, in an elm, and was composed of twigs and a small amount of cotton. She then returned to what had probably been her first home, tugged at a piece of grape vine and carried it also to her new dwelling, where she drove off two

English Sparrows that were in her way. She made one more visit to the new nest during the hour I watched.

Both parents gave battle to a passing Blue Jay, but a Nighthawk winged its way unheeded.

At one time all five babies were on the same branch, but they changed their positions frequently, sometimes flying to the place where a parent had mounted guard, sometimes hurrying over to beg frantically beside a lucky brother that had just received an insect. Between 6:00 and 7:00 A. M. the young were fed twenty-three times by both parents, one of whom worked much harder than the other.

Four days later I visited the same spot about 5:30 in the morning and found that the tails of the young shrikes were nearly as long as those of the parents. Mother was getting cotton and twine from the old nest for the new one. As she flew past she was fervently appealed to by a baby, but her mind was on other matters. One youngster begged from another, but, on seeing his mistake, tried to peck his brother. Two Mourning Doves were courting on the ground; a little shrike flew to them and they separated; he darted at one who retreated and then at the other. He hurried after a grasshopper but in vain.

A Mockingbird was driven by the parent shrikes from the elm in which their young had been perched on May 25, although none were there at this time.

Three babies congregated by the fence, hoping for a tidbit from father. They teased and teased whenever he was near. Two flew to the ground and experimented busily, picking up little bits of things and tweaking cotton stalks. One actually got something for himself, for he ate and ate. While they were foraging, one of them noted that father had darted to the ground. He hurried toward him and got his reward. Father fed eight times in fifteen minutes. All of the food given on both days that I was present consisted of insects.

The parent shrikes looked alike, but it seems probable that mother was the one moving house for the second brood and that father was taking most of the care of the fledglings.—MARGARET M. NICE, *Columbus, Ohio.*

Some Notes on the Fall Migration of Shore Birds.—"Practically nothing is known as yet of the manner in which single birds travel", says Wetmore, "since our observations to date have been restricted mainly to group identification." And again, "Definite data as to the rate at which birds travel south in autumn are lacking" (Migration of Birds, pp. 113-114). This being the case I thought that certain observations on shore birds made by me during the past autumn might be of interest.

On October 27 I saw a Black-bellied Plover on the shore of one of our Madison lakes. I was interested in it not only because these plovers are of uncommon occurrence here in the fall but also for the reason that this individual had but one good leg, the right one being severed about half way up. In spite of this mishap, however, the bird appeared to be in excellent condition and flew in an entirely normal manner. Up to and including November 4, I saw it at the same spot on five different days, so that its stay covered at least nine days. The weather during this period had been unseasonably warm, but on November 5, after an unusually cold night, the bird was gone.

On five occasions from October 21 to October 29, inclusive (another period of nine days), I saw a lone Pectoral Sandpiper on a neighboring pond. In this

instance there was no such distinguishing mark as in the case of the plover, so that the evidence of its being the same bird each time was not so satisfactory, but I believe this was the fact. It was a late date here for this species, the latest in fact, on record, and although during this period I visited all the likely spots in our area I found no others of its kind.

So, too, I saw on October 8, 12, and 15, a period covering eight days, a little band of Dowitchers. Here again is a species that is decidedly uncommon here at this time of the year, there being only three previous fall records. Bent, indeed, gives no fall dates for any of the north-central states. There were three birds in the small flock in question and they were found each time in the same place, wading about in the shallow water of a tiny bay, feeding industriously with bills pointed downward in true Dowitcher fashion.

No variation in plumage could be discerned in any of these birds from day to day, a fact which is of only negative value since none but young birds are likely to appear so late in the year and they would look much alike. Their scarcity at this season, however, and the fact that they were always found in the same spot makes it highly probable that they were the same individuals. If this is so they were surely traveling in a leisurely manner.—JOHN S. MAIN, *Madison, Wis.*

Migration Notes on Swans West of the Mississippi.—During the hunting season of 1929, two reports of swans were received. Early in November a swan was shot and wounded at Honey Creek Lake, near Council Bluffs, Iowa. The bird was turned over to the State Game Farm, at Clive, Iowa. In the latter part of November, a hunter killed a swan at Swan Lake, near O'Neill, Nebraska, and he gave the bird to a Federal Game Warden.

The fall of 1930 furnished several records of the Whistling Swan (*Olor columbianus*). Two hunters killed a swan near Castana, Iowa, about forty miles south of Sioux City, during the last part of October. At about this same time eight swans were destroyed by hunters at Mountain Lake, in southwestern Minnesota. These birds were all given to a game warden. This same week witnessed the slaughter of six swans at Appleton, in western Minnesota, but in this case the birds were confiscated by a game warden and the men were fined ten dollars for each swan. I believe these latter birds were sent to the University of Minnesota Museum. Two immature swans were shot by error on October 20, 1930, from a sandbar in the Missouri River about a mile or two above the mouth of the Big Sioux River, which would be opposite the South Dakota shore. Both birds were identified by T. C. Stephens as *columbianus*, and were later turned over to the resident game warden.

Near the middle of November, three wounded swans were found by Game Warden C. C. Watters, of Long Prairie, Minnesota. One of the birds died and was given to the high school and the other two were cared for by Mr. Watters. The last swan reported killed was on November 23, when hunters at Yankton, South Dakota, saw two of the birds and shot one of them. This swan was identified as a Whistling Swan by Dr. A. P. Larrabee, of Yankton College, Yankton, South Dakota.

The writer thinks that the birds recorded above were in most cases not shot at deliberately, but were actually mistaken for Snow Geese, which come through this region in great numbers. Another comment is that these swans

are often reported as Trumpeter Swans (*Olor buccinator*) but most likely all the swans here recorded as taken in this region have been of the smaller species.

Two sight records of swans are also worthy of mention. During the first part of November, 1930, Mr. M. A. Mather, of Sioux City, saw a flock of about fifteen swans fly over Badger Lake, Monona County, Iowa. Early in December, 1930, a flock of swans was reported at Phoenix, in northern Nebraska, and was said to be the only flock known to have passed through that region in the last ten years.

Mr. B. W. Cartwright, of Deer Lodge, Winnipeg, Canada, reported a very heavy flight of Whistling Swans at Lakes Manitoba and Whitewater, during the fall of 1930. The above 1930 records show that the flight was more abundant than usual, and that it was well scattered.—Wm. Youngworth, *Sioux City, Iowa.*

The 1930 Fall Migration at Cleveland's Public Square.—Between August 7, 1930, and December 29, 1930, a check of birds present at the Public Square in Cleveland, Ohio, revealed a total of thirty-one species, visits being made nearly every day except Sundays in this period. This locality was described in my report published in the Wilson Bulletin of June, 1930 (Vol. XLII, No. 2). The following is my list of species seen this year:

Species	First Record	Last Record	No. of Days Seen	Largest No. in One Day
Herring Gull	Oct. 18	Dec. 16	10	8
Sora	Oct. 1		1	1
Duck Hawk	Oct. 24		1	1
Sparrow Hawk	Aug. 25	Nov. 17	10	2
Bobolink	Aug. 7	Aug. 21	12	1
Savannah Sparrow	Sep. 30	Oct. 2	3	1
White-crowned Sparrow	Oct. 1	Oct. 16	10	1
White-throated Sparrow	Sep. 24	Nov. 29	56	43
Tree Sparrow	Oct. 23		1	1
Slate-colored Junco	Sep. 30	Oct. 28	2	1
Song Sparrow	Sep. 8	Dec. 29	35	2
Lincoln's Sparrow	Sep. 8	Oct. 11	9	2
Black and White Warbler	Aug. 13		1	1
Nashville Warbler	Sep. 25	Sep. 26	2	1
Chestnut-sided Warbler	Aug. 23		1	1
Bay-breasted Warbler	Sep. 24		1	1
Black-poll Warbler	Sep. 16	Oct. 15	16	2
Palm Warbler	Sep. 23	Oct. 4	6	1
Louisiana Water-Thrush	Sep. 3	Sep. 5	3	1
Northern Yellow-throat	Aug. 21	Oct. 2	17	2
Wilson's Warbler	Sep. 24	Sep. 26	3	1
Redstart	Sep. 19	Sep. 22	3	1
Catbird	Sep. 20	Oct. 18	19	2
House Wren	Oct. 1	Oct. 9	5	2
Winter Wren	Oct. 11		1	1
Long-billed Marsh Wren	Sep. 17		1	1
Golden-crowned Kinglet	Oct. 15	Oct. 21	2	2
Veery	Sep. 19	Sep. 20	2	1
Olive-backed Thrush	Sep. 18		1	1
Hermit Thrush	Oct. 9		1	1
Robin	Oct. 3		1	1

The largest number of species occurred on October 1, when I found eight, totalling nineteen individuals. On October 25 I managed to pick out at least

forty-three White-throated Sparrows mingled among the many English Sparrows present at that time. Most of these white-throats were in the immature plumage, and after acquiring city soot for several weeks, they were almost indistinguishable from any other brown bird, except by mannerisms and form.

There are several species in this list which were new to me and rather unexpected in such a locality. The Sora was seen lying dead on the grass beside a tall, slender monument. It had evidently struck the shaft the night before. I saw the Duck Hawk several times from my office window as the bird soared over the Square, putting the flock of Pigeons into a frenzy of fear. The Bobolink was a bird in the fall plumage, well able to fly and apparently in good health. It stayed close to that portion of the Square where there is the largest area of lawn, and walked about among the English Sparrows, feeding with little evidence of fear of man. Among the most unusual was the case of the Louisiana Water-Thrush. In some manner this bird had blundered its way inside of the lobby of the Union Terminal Building, and there it spent three days flying over the heads of the many people who were going to and from the offices and trains. Occasionally it stopped to rest on a sash of one of the great windows which kept it a prisoner, and most of the time it called continually with its characteristic piercing chip. The Robin seen on October 3 was the second Robin which I have found at the Square in over five years of observation, although the bird breeds commonly in yards not much over a mile away.

Several of the birds were enough at home to venture fragments of their songs. The Veery, White-crowned Sparrow and White-throated Sparrow all sang, the last doing so quite frequently. With two exceptions, all of the birds seen appeared to be in good condition. The Golden-crowned Kinglet seen on October 15 was on the ground, barely able to hop, with its feathers very much ruffled and disheveled. One white-throat, seen over a period of several weeks, had lost its tail, but appeared to be handicapped only a little in its flight and efforts to find crumbs.

The remodeling of one section of the Square removed a fountain and pool which had been surrounded by flower beds and several shrubs and substituted plain patches of grass. This change made a noticeable reduction in the number of birds seen in the section, robbing several species of hiding places which had been very welcome in the past. A great increase in the number of Starlings about the Square, culminating in a flock, estimated at 3,000, on November 3, must have had some effect on the movements of native birds.—WILLIAM H. WATTERSON, *Cleveland, Ohio.*

Notes on the Starling from South-Central Indiana.—In the summer of 1925 I learned, through a short item in a daily paper, that the Starling (*Sturnus vulgaris*) had reached central Ohio. I knew that the Starling had been brought from England and liberated in New York some time in the 1880's, but, of course, I had never seen one. However, badly as I desired to meet the stranger, I feared his coming from the standpoint of our native bird life. But I knew that they would come, so I was on the lookout for the first arrival.

I met my first Starling shortly before noon on February 18, 1927. One was brought to me by J. W., a neighbor, who knew of my interest in birds. So the first one I ever saw I was permitted to hold in my hands. J. W. did not know what bird it was, but I recognized it at once from pictures that I possessed.

He had caught it the night before, together with some pigeons that he wished to market. Noting a strange bird among them, he blinded it with a flashlight and caught and imprisoned it in a box. He saw no others, and this one he liberated on his return home.

My first meeting with the Starling has now been almost four years ago and yet I have not seen their nests. J. W. has a flock of about sixty now, but the queer part of the matter is that they spend only the winter with him; during the summer not a Starling can be found on his premises. Where do they go? I know a few other places where one may find them in the winter but they all seem to disappear during the summer. Those that I have watched spend the bright days, or bright parts of a day, away from the buildings and among the trees or in the fields, but toward evening and on cloudy days they huddle with the pigeons in the higher, darker parts of the barn. The English Sparrows do not mingle with them to any extent. Also, I believe that the Starling, if possible, is the more intelligent bird. They seem to be sociable, congregating in flocks at various times and wheeling here and there as they move from tree to tree or from one part of a field to another. Their notes remind me not a little of those made by a flock of young turkeys; irregular, but not so continuous, nor so loud.

After becoming acquainted with the Starling, and having read everything pertaining to them that I could obtain, I had forgotten pretty much about them except that I had still to see one of their nests. So it was a bit of a surprise when, on December 27, 1928, another friend, a village storekeeper, brought me a shoe box containing half a dozen dead Starlings. He wanted to know what birds they were. I told him. "Write that down", he said, "I'll forget it, and Father Gadlage wants to know. I told him that I'd find out." Rev. Herman Gadlage of St. Maurice, a village west of my home, had found that morning about fifty dead Starlings under the evergreens in front of his home. Among them were about a dozen dead English Sparrows. What had killed them? Excepting a light rain the night before they had suffered nothing from the elements. The death of so many birds, under the circumstances, has me puzzled.

Since meeting my first Starling I have heard other reports to the effect that they are not nearly so bad as I had been led to believe. This is welcome news, indeed, if it is true. As we have them anyway, we can do no better than to wait and see how they conduct themselves.—Grant Henderson, *Greensburg, Ind.*

The Gambel's Sparrow at National, Iowa.—Probably several of those who heard Prof. Swenk's admirable paper on "The Crown Sparrows" at the Des Moines meeting of the Wilson Ornithological Club resolved to be more careful when identifying sparrows with white crowns. My opportunity to profit by such a resolution came on October 6, 1930, under circumstances most favorable for identifying. The water of neighboring brooks had been dried up in the season of drought, therefore water for the birds had been placed for them in a bird bath fourteen feet from a window. To it there came on the date mentioned a Gambel's Sparrow that remained several minutes to drink and bathe. It was so near that its distinguishing marks could easily be seen.—Althea R. Sherman, *National, Iowa.*

ORNITHOLOGICAL LITERATURE

THIRTY YEARS WAR FOR WILD LIFE—GAINS AND LOSSES IN THE THANKLESS TASK. By William T. Hornaday. Charles Scribner's Sons, New York, 1931. Pp. i-xvi+1-292. Price, $2.00.

In Part I of this book fifteen chapters tell of the dangers which confront American wild life—"the dark side". Here the gruesome story of destruction is placed on record, not merely for the information of future generations, but, doubtless, with a hope of stimulating the present generation from the lethargy of inaction. Chapters XIV and XV are especially interesting because they deal with the conservation contests of the past two or three years.

Part II consists of eighteen chapters dealing with the progress of conservation achievement in America—"the bright side". The facts show that much has been done, mostly, however, for the mammals. These chapters do not cover the establishment of the numerous bird refuges throughout the country, but they do disclose an amazing story of accomplishment. It is also amazing that in spite of so many victories for wild life, the latter is still in great danger owing to the tremendous increase in population and sport. Much of the story is very recent history—so recent that many people have not read it. Much of it has never been in print before.

It seems to be quite safe to say that no one man has been in the midst of so much effort and struggle in behalf of wild life as Dr. Hornaday. It may be doubtful if any one else has possessed the same broad knowledge of the field; no one else has shown greater devotion, greater acumen, more dogged persistance or greater courage in the face of fierce opposition than Dr. Hornaday. Future generations will scarcely fail to recognize him as the great leader in the fight for the protection of wild life. Some who have derived their livelihood for working in behalf of wild life have followed *ignes fatui* while the wild life suffered accordingly. Dr. Hornaday has never been side-tracked, and his language has never been misunderstood much as it may have been disliked. This book is not a story of his life, but it shows what a powerful force he has been in molding public sentiment and in putting theory into practice. No one interested in game protection will lay this book aside without completing the reading of it.—T. C. S.

REPORT ON A GAME SURVEY OF THE NORTH CENTRAL STATES. By Aldo Leopold. Published by the Sporting Arms and Ammunition Manufacturers' Institute. Madison, Wisconsin, 1931. Pp. 1-299, maps 21, charts 15, tables 58, photographs 4. Price, $1 (from American Game Association, Investment Bldg., 15th and K St., N. W., Washington, D. C.).

This report is the most original and exhaustive study of upland game conditions which the reviewer has seen. The Survey has been carried out by Mr. Aldo Leopold (a holder of the gold medal of the Permanent Wild Life Protection Fund for distinguished services to wild life) under the auspices of the Sporting Arms and Ammunition Manufacturers' Institute, and for an area called the "North Central States", including Michigan, Wisconsin, Minnesota, Iowa, Illinois, Indiana, Ohio, and Missouri. The chapters deal chiefly with the following topics: Bob-white, Rabbits, Ring-necked Pheasant, the Game Cycle, Ruffed Grouse, Prairie Chickens, Big Game (including deer and turkeys!), Waterfowl, Predators, Game Lands and Game Administration, the Conservation Movement, Con-

clusions. The chapter on Bob-white covers forty-five pages, divided under the following headings: history, status, movements, life history, food and coverts, effects of weather, management, etc. The detail gives some idea of the range of treatment.

This Survey has been undertaken by Mr. Leopold and the arms and ammunition manufacturers apparently for the purpose of ascertaining certain facts concerning the game, and perhaps also for the purpose of education and propaganda in the interest of an increased supply of game. One of Mr. Leopold's principal points of emphasis is the scientific study of game—game research. He points out that in 1927, to the best of his knowledge, there was only one person in this group of states who was carrying on research relative to game, whereas in 1930 there were fourteen. Of these fourteen workers three are in Minnesota, two are in Wisconsin, seven are in Michigan, and two are in Ohio. Iowa, Illinois, and Missouri have none. Three of these research men are holders of fellowships recently established by the Sporting Arms and Ammunition Manufacturers' Institute, as follows: at the University of Minnesota R. T. King is working on the complex problem of the Ruffed Groues; at the University of Wisconsin Paul L. Errington is working similarly on the Bob-white; and at the University of Michigan R. E. Yeatter is working on the Hungarian Partridge. The other workers seem to be financed, in most cases, by the State Game or Conservation Department. The important fact is, however, that the work has been placed on a research basis. This means that the work is being carried on free from bias or control, and with reasonable thoroughness. The university connection engenders confidence in this.

It may seem that the arms and ammunition manufacturers have changed base somewhat in thus making a liaison with science. Perhaps so, but there is nothing strange or illogical about it. Continuation of their business, between war periods, depends to a large degree upon the perpetuation of game. Perpetuation of game is exactly the objective of conservationists. In this respect, therefore, there is a common basis of agreement. Let us make the most of that fact.

We are still opposed to the substitution of foreign game for native game. Such substitution is based on a galaxy of fallacies. But we believe that we are consistent in approving one part of the program and disapproving another, if we keep the two parts separate in our thinking. With these reflections in mind we feel indebted to the Game Survey for its fact-finding service, and we hope that it (and its sponsors) will find so much success in developing the native wild life that exotic forms will be found to be superfluous.—T. C. S.

THE BIRDS OF OKLAHOMA. Revised edition. By Margaret Morse Nice. Pub. Univ. Okla. Biol. Surv., Vol. III, No. 1, pp. 1-224. Norman, 1931.

Mrs. Nice presents in this paper not merely a revision of "The Birds of Oklahoma", by Mrs. M. M. Nice and L. B. Nice, (published in May, 1924, as a University of Oklahoma bulletin), but practically a rewritten work. The historical sketch is materially new. The "Itineraries and Reports of Field Workers in the State" is a new and most valuable addition, listing all known ornithological observers in the state from the earliest records; it is in reality a part of the history of ornithology of the state.

The list proper includes 385 forms, as contrasted with 361 in the 1924 edition. However, several of the forms listed in the old edition have been dropped

in the new one, and, of course, new forms have been added, 35 in number. Ten species are listed as extirpated in the state, viz., Trumpeter Swan, Swallow-tailed Kite, White-tailed Kite, Sharp-tailed Grouse, Sage Hen, Whooping Crane, Eskimo Curlew, Passenger Pigeon, Louisiana Paraquet, and Ivory-billed Woodpecker.

The author has had the advice of Dr. Stone in the selection of the nomenclature, which will, therefore, probably conform closely to the new A. O. U. check-list. A bibliography relating to Oklahoma ornithology is appended, together with several maps and halftones. It is quite apparent that much effort is being made to advance the ornithology of this state, and keep it abreast of general progress.—T. C. S.

Birds of Arkansas. By W. J. Baerg. Bull. No. 258, Ark. Agric. Exp. Station, pp. 1-197, figs. 1-37. Fayetteville, 1931. Price, 77 cents.

Howell's "Birds of Arkansas" (1911) listed 255 forms. Several other faunal lists for this state have appeared in the periodical literature, and are acknowledged by the author of the paper here reviewed. Baerg has increased the number to 312 species and subspecies. The list includes a description of the plumage, a statement of the range, and some discussion of habits for each species. This bulletin forms a very complete and useful handbook of the birds of Arkansas, named and arranged in the latest predicted nomenclature.—T. C. S.

Bulletin of the Essex County Ornithological Society [Mass.] for 1930. Pp. 1-89. Price, 50 cents.

This annual has now been published in twelve successive years. Most of the articles deal with local ornithology, but in a number of cases have general interest. For instance, Mr. Emilio records the capture of a specimen of Say's Phoebe at Ipswich, Mass., in October, 1930. Philip Emerson records the nesting of the Blue-gray Gnatcatcher in northeastern Massachusetts. The description of the bird is good, but the editors advise caution, because the nest is atypical. We should not be much surprised at the construction of an atypical nest by birds that get so far out of their normal range—they are probably not exactly typical birds, psychologically. Mr. Emilio also presents an instructive account of North American birds which have been recorded from time to time on the British Isles. Dr. Townsend and Dr. May both contribute articles on the birds of prey.—T. C. S.

Handbook of the Birds of Golden Gate Park. By Joseph Mailliard. Special publication of the California Academy of Sciences, pp. 1-84. San Francisco, 1930.

We count 110 native species listed and described in this booklet. Ninety-four of the species are illustrated by pen sketches made by Mr. Frank Tose. There is also an appended list of eleven introduced species on the waters of the Park. We are not in a position to pass critical judgment on the inclusions or omissions from the list, but it is certainly a fine thing to have such a guide available to visitors in this western center of population, and it would seem that this substantial little book will serve its purpose well.—T. C. S.

Bird List of Vicksburg, Michigan. By F. W. Rapp. Privately printed, Vicksburg, Mich., 1931. Pp. 1-35. Price, 35 cents.

Mr. Rapp lists 179 species (plus 3 extinct or hypothetical forms) based upon thirty-five years of observation.—T. C. S.

BIBLIOGRAPHY OF OHIO ZOOLOGY. Compiled by Herbert Osborn. Bull. 23, Ohio Biol. Surv., Vol. IV, No. 8, pp. 351-411. (Pub. by Ohio State Univ. Press), Columbus, 1930. Price, $1.00.

Good as far as it goes. This paper purports to be a reasonably complete bibliography of Ohio zoology, and the index indicates that a good many ornithological titles have been found, perhaps more than for any other animal group. It is quite apparent, however, that the WILSON BULLETIN was not searched for Ohio material. In the WILSON BULLETIN for 1909 G. Clyde Fisher reported the Prothonotary Warbler at the Lewistown Reservoir. The volume for 1908 contained a note by Robert J. Sim on another record of Brunnich's Murre for Ohio, and L. S. Keyser reports Bachman's Sparrow in Tuscarawas County. Two notes by Jones on Bachman's Sparrow and Bewick's Wren in 1909 are overlooked. In 1919 Oberholser reported the Hoyt's Horned Lark for Ohio. Various other notes by Henninger, McConnell, Jones, Bales, Wharram, Henderson, Katie M. Roads, Pontius, Blincoe, Louis W. Campbell, Moseley, and others have been missed. Henninger published forty-four ornithological notes, mostly relating to Ohio, in the WILSON BULLETIN, all of which were overlooked. These noted omissions are discovered by glancing in the few volumes picked out at random; doubtless they form a small part of Ohio ornithology overlooked by the bibliographers. It seems inexcusable to thus overlook a magazine which specializes in one branch of zoology, and especially in view of the fact that the WILSON BULLETIN was for many years published in Ohio, and might be expected to contain many references to Ohio ornithology.

We suspect that the compilation of the bibliography was done entirely by consulting the volume indexes for state references. If, for example, we examine the volume of *Bird-Lore* for 1923 we find that its index contains eleven Ohio references, eight of which are included in the Ohio bibliography (the three not included are merely club reports). On the other hand pages 186 and 252 of the same volume contain ornithological notes from Ohio of as much value as others cited, and these two items are not cited in the volume index, nor do we find them listed in the Ohio bibliography. It would seem that we must conclude that the bibliography was compiled by scanning the indexes of the periodicals, an evidently faulty method of preparing a bibliography. If all periodical literature has been searched in the same faulty manner, with the same proportion of omission, just what reliance may workers place upon the Ohio bibliography as an aid? A bibliography is no easy matter, and when done no one can be quite certain of its completeness. The substance of our criticism in this case is that for the sake of accuracy the body of the journal should be searched, and that reliance can not be placed on the volume indexes.—T. C. S.

BIRD BANDING BY SYSTEMATIC TRAPPING. By S. Prentiss Baldwin. Sci. Pub. Cleveland Mus. Nat. Hist., Vol. I, No. 5, pp. 125-168, April, 1931.

The bulletin here described reprints two of Mr. Baldwin's most important papers on the bird banding work. The first paper, under the same title as above, was published in 1919 by the Linnaean Society of New York, and was the first published report on Mr. Baldwin's method of trapping and banding wild birds as practiced by him during the preceding five years. Mr. Baldwin's great contribution was the use of traps for capturing adult birds for banding. Previous to his work most of the banding had been done on nestling birds, with which the

mortality was very high, greatly reducing the percentage of returns. This paper is a classic in the literature of bird banding, and has been out of print for some time; the reprinting of it by the Cleveland Museum makes it again available. Along with this article Mr. Baldwin's paper on "The Marriage Relations of the House Wren" (first published in the *Auk* for 1921) is also republished. This paper demonstrated the usefulness of the banding method in working out the domestic and social relations of birds. We understand that free copies of this reprint are obtainable upon request to the U. S. Biological Survey, Washington. —T. C. S.

A Biological Reconnaissance of the Peterboro Swamp and the Labrador Pond Areas. By Chas. J. Spiker. Roosevelt Wild Life Bulletin, Vol. VI, No. 1, Syracuse, N. Y., March, 1931. Pp. 1-151, pp. 1-3, figs. 1-74, maps 1-2. Price, $1.00.

The region described in this paper suggests to us Mr. Sutton's account of the Pymatuning Swamp in Pennsylvania, though the Peteroboro Swamp seems to possess far fewer species of birds. Mr. Spiker divides his area into six plant habitats and describes the bird life of each. The total list of 114 species for the entire region suggests a very ordinary fauna, with the understanding that it has been studied in the winter and spring as well as summer. Mr. Spiker's study of the territory began with a six-weeks' sojourn in the summer of 1927. The paper does not state precisely the periods of later study, but "subsequent visits to the tract at other seasons of the year have given us a reasonably complete view of the area during the whole year."

In Part 2 the same author reports on a biological survey of Labrador Pond, located also in the center of the state. For this region 107 species of birds are reported. The surveys of both regions include some mention of the mammals, more extensive, however, for the Peterboro area. Both surveys were undertaken to determine the wild life present and also the fitness of the habitats for the introduction of game birds. Besides the numerous halftone illustrations by the author Mr. E. J. Sawyer has contributed a colored plate of the common winter birds.—T. C. S.

Adaptive Modifications in the Woodpeckers. By William Henry Burt. Univ. Calif. Publ. Zool., Vol. 32, No. 8, pp. 455-524. Berkeley, 1930. Price, $1.00.

Work has been done on a wide variety of picine material, including particularly a study of the muscles and their attachments. The details of the origin and insertion of muscles in the Pileated Woodpecker are presented quite fully. —T. C. S.

The Birds of Haiti and the Dominican Republic. By Alexander Wetmore and Bradshaw H. Swales. Bull. 155 U. S. Nat. Mus., pp. 1-483, pls. 1-26. Washington, 1931. Price, $1.00.

The older name for the entire island which now contains the Dominican Republic and the Republic of Haiti was Hispaniola, more recently known as Santo Domingo. The present work gives a full historical account of previous ornithological work, beginning with the visit of Columbus in 1492. Two hundred and fifteen species are listed by the authors, while thirteen others are considered as hypothetical. The status of each species is fully discussed in the light of the latest knowledge.—T. C. S.

Bird Houses. How to Make and Where to Place Them. By E. J. Sawyer. Bull. No. 1, Cranbrook Institute of Science, Bloomfield Hills, Mich., March, 1931. Pp. 1-27. Price, 20 cents.

Mr. Sawyer here gives in brief form most of the information needed in building and erecting houses for about sixteen species that most frequently nest around human dwellings. The detailed specifications are shown in full page plates prepared by the author.—T. C. S.

Making Use of Our Birds. By O. A. Stevens. Bull. 241, N. Dak. Agric. Exper. Station, pp. 1-40. Fargo, December, 1930.

This pamphlet is a revision of a similar one issued in 1926, but the revised edition contains some additional matter and is enhanced by two tabulations and sixteen halftones. The greater part of this bulletin is made up of an enumeration of the commoner birds of the state, with some account of their habits. —T. C. S.

Information for the Guidance of Field Men and Cooperators of the Bureau of Biological Survey Engaged in the Control of Injurious Rodents and Predatory Animals. By Paul G. Redington and Stanley P. Young. Misc. Publ. No. 115, U. S. Dept. Agric., pp. 1-8. Washington, April, 1931.

A statement of policy of the Bureau of Biological Survey with respect to its campaign against these mammals, and some general remarks on methods. This bulletin has been reviewed at considerable length in a circular published by the Emergency Conservation Committee, which may be obtained gratis by applying to Mrs. C. N. Edge, Secretary, 113 East 72d St., New York, N. Y.—T. C. S.

Notes on a Collection of Birds from Western Oklahoma. By A. I. Ortenberger and Elbert L. Little, Jr. Pub. Univ. Okla. Biol. Surv., Vol. II, No. 4, pp. 189-194. Norman, 1930.

A List of the Birds of the Campus of the University of Oklahoma. By Margaret Morse Nice. *Ibid.*, pp. 195-207.

The first paper presents a list of birds obtained in the western part of Oklahoma by an expedition from the University in 1926. Some additions were made to the knowledge of the range of certain species within the state. In the second paper Mrs. Nice gives a very full account of previous bird study on the University Campus, together with a list of all forms known to have been found there.—T. C. S.

Progress Report of the Wisconsin Prairie Chicken Investigation. By Alfred O. Gross. Published by the Wisconsin Conservation Commission. Pp. 1-112. Madison, 1930.

The Wisconsin Conservation Commission inaugurated this study of the Prairie Chicken in 1928, and it has been in progress since that time. The present report is intended to place on record the results thus far obtained. The study has covered many phases of the life of this bird; we may merely mention the following topics which are considered: cycles, parasites and diseases (very full and instructive), food, migration (and some evidence is presented to show a limited seasonal movement), courtship, eggs, hatching, etc. Some very helpful suggestions are made about the construction of blinds, which will apply as well in the study of other birds. It is very pleasing to note the interest of state authorities in these scientific investigations.—T. C. S.

The Quail Shortage of 1930. By Aldo Leopold and John N. Ball. In Outdoor America, April, 1931. Reprint not paged.

A marked shortage of quail is noted in the quail range of the north central states (Minn., Wisc., Mich., Ohio, Ind., Ill., Ia., Mo.), in some parts approximating 75 per cent. The authors trace the shortage to the drouth of that year, 1930. Four theories as to the specific manner in which the drouth operated are offered, viz., by drying up the drinking water for the young birds, by addling the eggs in the nest, by bringing about disease, or by affecting the food supply. They also suggest that every state should have trained men available to trace these fluctuations of game, and determine the causes.—T. C. S.

A Year at Southampton Island. By George Miksch Sutton. Carnegie Magazine, Vol. IV, No. 9, pp. 269-273, Feb., 1931.

A Year on Southampton Island. By George Miksch Sutton. Cardinal, Vol. III, No. 1, pp. 1-5, Jan., 1931.

These two different articles under the same title give short, narrative accounts of Mr. Sutton's winter sojourn (1929-1930) at the far end of Hudson Bay, and are not reports of scientific results. But it is interesting to learn that a breeding colony of Blue Geese was located at Cape Kendall, on the western side of the Island. While Mr. Sutton was in the North he learned by radio of J. Dewey Soper's success in finding, in the summer of 1929, the Blue Geese breeding on Baffin's Land. This news stimulated Mr. Sutton's search for the Blue Goose on Southampton.—T. C. S.

Wild Duck Foods of North Dakota Lakes. By Franklin P. Metcalf. Tech. Bull. No. 221, U. S. Dept. Agric., pp. 1-71. Washington, 1931.

This paper contains nothing on birds, but is an ecological study of the common vegetation of North Dakota lakes. The relation of salinity to plant forms is considered. There is included an annotated list of the plants collected in and about the lakes and sloughs, and also a list of common and scientific equivalent names. Conclusions are not drawn as to relations to bird life.—T. C. S.

Local Bird Refuges. By W. L. McAtee. Farmers' Bull. No. 1644, U. S. Dept. Agric., pp. 1-14. Washington, 1931. Price, 5 cents.

A general discussion of bird refuges as a conservation measure.—T. C. S.

Notes on a Collection of Birds from Arizona and New Mexico. By Harry C. Oberholser. Sci. Publ. Cleveland Mus. Nat. Hist., Vol. I, No. 4, pp. 83-124. Cleveland, 1930.

Dr. Oberholser here presents a report of his study of a collection of birds obtained from Mr. W. W. Brown.—T. C. S.

Field Notes on Connecticut Birds. By Clinton Mellen Jones. Univ. Ia. Studies in Nat. Hist., Vol. XIII, No. 4, pp. 1-40. Iowa City, 1931. Price, 50 cents.

Dr. Stoner and Prof. Dill have selected from the old notebooks of Mr. Jones various notes of interest made from 1873 to 1916 in Connecticut.—T. C. S.

The *Florida Naturalist* for January contains an article by Herbert R. Mills on "The Florida Brown Pelican", which informs us that the pelicans on the east coast of Florida nest in the fall, while the same species on the west coast nest in the spring. The April number contains the proceedings of the Society.

The *Annual Bulletin of the Illinois Audubon Society* (No. 21, for 1931) contains a short article by Dr. A. O. Gross on the Prairie Chicken; several appreciative sketches of Professor Frank Smith, with a portrait; and a paper by W. I. Lyon on a northern invasion of Little Blue Herons. Numerous other short articles make up an interesting booklet.

The *Wren-Tit* is published quarterly by the Santa Clara Valley Audubon Society. The January number tells of finding the roosting place of two Black Swifts on a ledge behind a water falls.

Iowa Bird Life is the title of a leaflet published under the auspices of the Iowa Ornithologists' Union, and edited by Fred J. Pierce. It is in reality a continuation of the I. O. U. Bulletin, but with a changed format and labelled Volume I, Number 1, new series. This number contains a considerable amount of matter of particular interest to Iowa bird students, including articles by Miss Sherman, E. D. Nauman, Dr. F. L. R. Roberts, and others. Starting as a mimeographed news letter issued by the Secretary, this leaflet developed into a larger printed sheet edited by Dr. Roberts; it is now reduced to octavo size with sixteen pages. We hope the venture will have staying power, and that its quality will not diminish.

The Migrant, of the Tennessee Ornithological Society, also appears in printed, octavo form, beginning with Volume II, No. 1, for March, 1931. This number consists of eight pages and cover, with the following articles: "The Black Vul- the March number contains, "The Winter Birds of the Hastings Region", by A. F. Ganier, "Hawks and Owls", by H. P. Ijams, "Nesting Data on Middle Tennessee Birds", by Vernon Sharp, Jr., and besides these a blue-print sheet of specifications for a standard bird house.

The December number of the *Flicker* (a mimeographed organ of the Minnesota Bird Club) contains, "Experiences with a Green-winged Teal", by Marius Morse, "Summer Birds Near Onamia, Minnesota", by E. D. Swedenborg; while the March number contains, "The Winter Birds of the Hastings Region", by Jerome Stoudt, "A Day's Adventure", by Sterling Brackett, and "Bird Notes from Frontenac, on Lake Pepin, for 1930", by Alden Risser. In 1931 it is proposed to issue four numbers of the *Flicker*, instead of six.

The *Raven*, mimeographed organ of Virginia Society of Ornithology, continues to reach us monthly. The February number contains a provisional list of the birds of Virginia, based on observations in nine localities; the list includes 279 species. The first annual meeting of the Society was held at Richmond and is reported in detail in the March number of the *Raven*.

Three mimeographed periodicals relating to bird banding have been received. *Bird Banding Notes*, for April, 1931, Vol. 2, No. 3, contains a report on returns, doings of many individual workers, and miscellaneous information. *Inland Bird Banding News*, March, 1931, Vol. III, No. 1, is issued under the direction of the new I. B. B. A. Secretary, Mr. Edw. R. Ford. This number contains fifteen pages of interesting banding information. *News from the Bird Banders*, April, 1931, Vol. VI, No. 1, is issued by the Western Bird Banding Association. The active center, or perhaps it would be more correct to say the administrative center, has been transferred from Los Angeles to the Museum of Zoology at Berkeley as a more or less permanent arrangement. The Hooper Research Foundation of the University of California Medical School has agreed to examine diseased birds which are caught in trapping operations.

CONCERNING A MATTER—

Dear Dr. Stephens:

Occasionally we have in the past received letters and notes from members complaining, sometimes gently, sometimes with more force, of the fact that we have invited them to become members when they are already members. These complaints somehow seem unavoidable because it appears impossible to eliminate all re-solicitation.

When you figure that the Secretary has three different files of prospective members containing about four thousand names, you will realize that the problem of accurate checking is a difficult one. A great many of the people whose names appear on these lists belong to a number of organizations or are interested in a number of fields of activity and consequently their names appear on a number of different lists. Sometimes the address on one list will be the person's home address, on another, it may be his office address, on a third, it may be sent to him in care of a commercial firm or school or museum, *et cetera*. Sometimes a man's initials, sometimes his first name are given, etc. The problem of checking these lists against each other and against the roll of the Wilson Ornithological Club seems a task in which complete accuracy is impossible.

It is one of the penalties of prominence that certain people appear on different lists in such a way that duplication and re-solicitation appears occasionally unavoidable. So I hope that our members to whom this occurs will understand that we are trying our best to keep from giving them unnecessary annoyance. One suggestion that you might care to make to the member who has been re-solicited is this: If he would take the letter, sample program, and application cards, which have been wasted in being sent to him and put them in an envelope addressed to a friend of his, it would help immensely. In this way our members would be helping the friends to whom they send this information and, of course, the Wilson Ornithological Club would profit by this new contact which it might not otherwise have been able to make.

I trust that this explanation will satisfy those members whom we have unwittingly re-solicited. We hope they will forgive us for our unknowing attempt to re-interest them in our organization.

Sincerely yours,

JESSE M. SHAVER, *Secretary*,
Wilson Ornithological Club.

Our Library

The Wilson Ornithological Research Library at Ann Arbor is now an establishment, but with empty shelves. The arrangement with the Museum of Zoology of the University of Michigan is printed in full in the last (March) issue of the WILSON BULLETIN. This Library now solicits contributions from the members and friends. Publications on ornithology, and the allied subjects of ecology, anatomy, exploration, travel, etc., are desired. And the following types of publications are suggested as especially desirable:

Single volumes, bound or unbound

Magazines, sets, volumes, and numbers, foreign or domestic

Authors' reprints

Maps

Reports and journals of explorations

Biographies

Bibliographies, printed and manuscript

State natural history and geological surveys

Proceedings or transactions of state scientific societies

Manuscript notebooks

Original paintings or drawings of birds

Photographs of birds, nests, eggs, habitats, etc.

Portraits of ornithologists

All portraits and photographs should be accompanied with full identifying data. Authors are requested to deposit a set of reprints of their publications. Members who wish to bequeath their libraries are invited to correspond with the officers of the Club. All gifts should be addressed to

THE W. O. C. ORNITHOLOGICAL LIBRARY,
Museum of Zoology,
ANN ARBOR, MICHIGAN